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PREPAREDNESS FOR EPIDEMICS AND BIOTERRORISM

HEARING
BEFORE A
SUBCOMMITTEE OF THE
COMMITTEE ON APPROPRIATIONS
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PREPAREDNESS FOR EPIDEMICS AND BIOTERRORISM

TUESDAY, JUNE 2, 1998

U.S. SENATE,
SUBCOMMITTEE ON LABOR, HEALTH AND HUMAN
SERVICES, AND EDUCATION, AND RELATED AGENCIES,
COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 2:14 p.m., in room SD-138, Dirksen
Senate Office Building, Hon. Lauch Faircloth, presiding.
Present: Senator Faircloth.

NONDEPARTMENTAL WITNESS

**STATEMENT OF LUTHER L. FINCHER, JR., FIRE CHIEF, CITY OF CHAR-
LOTTE, NC**

OPENING REMARKS OF SENATOR FAIRCLOTH

Senator FAIRCLOTH. The subcommittee will come to order. Today the panel will discuss our Nation's preparedness for epidemics and bioterrorism.

As some of you may know, Senator Specter, who had certainly planned to be with us, very successfully underwent heart bypass surgery and is going to be in the hospital for 5 or 6 days. The doctors tell us he is expected to make a full and complete recovery and will be back to his normal activities quickly. Knowing Arlen and the speed with which he does everything else, I would think he would handle this quickly too. But our thoughts and prayers are with him, and we wish him and his family a speedy recovery.

I would like to welcome everyone here today to discuss the growing problems of epidemics and bioterrorism. I am not a scientist but I am a pretty good reader, and a book I read recently called the "Hot Zone" by Richard Preston got me to thinking about what we are going to be talking about today. It got me to thinking how long viruses have been around and how difficult it is to protect ourselves from them. I have also learned about bacteria and how quickly they have become resistant to antibiotics which has very important implications for both human and animal medicine.

I am sure everyone here is aware that people are using germs and chemicals to try to hurt other people, not in a distant war, but right here in the United States. An incident recently occurred in my home State of North Carolina. And as I learn more about the growing problems of epidemics and bioterrorism, I'm concerned about our ability to protect people from these threats.

When bioterrorism is discussed, most people think of a military or law enforcement response. Those answers are obviously important, but today we want to focus on the public health response because I don't think we have devoted the resources and attention needed to assure sufficient protection.

Attorney General Janet Reno and FBI Director Louis Freeh share my concerns. During a recent congressional hearing, Attorney General Reno said she believes the Centers for Disease Control does not have adequate resources to deal with bioterrorism. Now this is coming from the U.S. Attorney General.

FBI Director Freeh then added that the Centers for Disease Control almost shipped a dangerous biological agent to an individual who had created a false identity using a stolen letterhead. I mean, the very idea that this potentially very, very dangerous material which could have devastated hundreds and thousands of people almost was released simply because the Centers for Disease Control did not have the resources to perform an onsite inspection of the address they were shipping the substance to.

Most of us believe our public health system has adequate resources to provide the network needed to protect us from the dangers of epidemics and terrorism. This simply is not true. Most people would be shocked to learn that less than 40 percent of our health departments can connect online to the command center at the Centers for Disease Control or to their own State health departments because they simply do not have computers. Some 20 percent of our health departments are still using rotary dial telephones.

For those who feel we should just ignore the public health folks and let law enforcement or the military take charge, I suggest you think again.

The first sign of a deadly new epidemic or serious terrorist attack is not going to be announced on the evening news. We're not going to see a battleship pull up to our shores and offload a microbe army. It will simply start with a large number of people falling ill and going to the doctor or emergency rooms in the area.

We are going to hear today from folks who have experienced these situations firsthand and can show us all of its vital importance to provide more resources to the Centers for Disease Control, the Public Health Service, and our State and local public health departments.

SUMMARY STATEMENT OF LUTHER FINCHER, JR.

Our first witness today will be Luther Fincher who is chief of the Charlotte Fire Department, needless to say, Charlotte, NC. [Laughter.]

Chief Fincher played a major role in responding to a recent incident that occurred in Charlotte.

He also serves as vice president of the International Association of Fire Chiefs and will become their president in the year 2000. I wish all politics was as certain as becoming president of the fire chiefs, Luther. [Laughter.]

Chief Fincher is a former Marine and attended the Kennedy School of Government at Harvard. His son Luther is also a member of the Charlotte Fire Department.

Chief Fincher, you may begin.

Mr. FINCHER. Thank you, sir.

Good afternoon, Mr. Chairman. I am Luther Fincher, chief of the Charlotte Fire Department in North Carolina. Thank you for this opportunity to speak and to provide input from an emergency services perspective to this committee.

As the fire chief of the city of Charlotte and vice president of the International Association of Fire Chiefs, I will briefly talk about domestic terrorism in our country, the first responders' role, and the public health.

On the morning of February 5, 1998, at approximately 10 a.m., a subject entered the front doors of our county court located just five blocks from the center of Charlotte. Upon entering the security checkpoint, he informed sheriff's deputies that he had an explosive device containing a chemical that, if released, would hurt a lot of people.

X rays at the checkpoint revealed that the device was real. It was detonated by bomb technicians 17 hours later when they determined that it did not contain chemical or biological agents. Fortunately for Charlotte, this incident had a positive outcome, but it was a wake-up call for us.

Charlotte lacks sufficient resources and training to deal with urban terrorism. The emergency services community is neither prepared nor adequately trained to mitigate incidents which involve weapons of mass destruction and chemical or biological agents. The threat of contamination is an important complicating factor. We do not have the means to make sure that we can mitigate an incident effectively, treat the victims without preventing secondary contamination of emergency personnel.

There are three areas where we must have clear understanding and Federal support.

First is the role of the first responders and Federal responders. When an act of terrorism occurs, only local emergency responders will provide the first and immediate mitigation of the incident. The work accomplished by these first responders in the first 2 to 3 hours will likely determine the number of lives saved and the ultimate outcome of the operation. Without proper training and equipment, first responders can take what may be normally considered an everyday emergency incident and create a disaster.

At this point public health is most vulnerable. The local health care system must treat patients while ensuring that first responders and its own workers do not become victims. Public health systems must be prepared to react immediately and with the correct information for first responders and our citizens. Decontamination procedures and facilities must be available, along with sufficient supplies of drugs and antidotes for whatever agent is present. The need and the challenge are enormous.

In almost all cases, Federal resources will not arrive for 6 to 8 hours. When they do arrive, the critical period is long past. As the terrorism response time line shows, the local first responders are unassisted for the most critical hours. Following notification of a terrorist act is an intense and vivid period when local first responders cope alone with the aftermath of these incidents.

The National Guard has been designated to work with Federal, State, and local officials. The Federal Government must acknowledge the role of the National Guard and other Federal resources when assimilated into the existing incident command system.

The Bureau of Justice Assistance training materials have been successful because they were developed with the National Fire Academy. The National Fire Academy's role in preparing fire and emergency service leaders for response to terrorism must be recognized and enhanced.

There is also the need for training assistance beyond the 120 most populous jurisdictions targeted by the Department of Justice [DOJ] and the Department of Defense [DOD]. Strategic and critical U.S. infrastructures are often located outside metropolitan areas. These areas are protected by volunteer departments. Congressional mandate must direct that Federal training reach fire and emergency services nationwide. The resident and nonresident programs of the National Fire Academy offer an excellent delivery system that should be utilized to the maximum extent possible.

Second is the incident command system. When Federal resources arrive, the incident command system will already be in place. The incident commander will plug Federal resources into the system. There is an urgent need for all Federal agencies which respond to emergencies to understand and adopt the incident command system.

Third is hospital capability. Any large scale incident involving weapons of mass destruction or chemical, biological, or nuclear agents will sorely test even the largest community's ability to deal with mass casualties. Congress needs to examine the ability of the hospitals to deal with victims at community hospitals or trauma centers under these conditions. Plans must be in place to protect local first responders as they mitigate incidents before the Federal resources arrive. The need for drug and antidote caches, decontamination facilities should be a focus of Congress. The Veterans Administration hospitals should be considered for an important role.

In conclusion, I would like to leave you with several thoughts and recommendations. The fire and emergency services need assistance from the Federal Government in the areas of training, detection equipment, personnel protective clothing, and mass decontamination capabilities.

No. 2, the Federal Government must organize its various missions and objectives with the clear understanding that once a terrorist incident occurs, the local first responder will be on the scene and operating within 6 minutes while Federal resources will not arrive for 6 hours. The Federal Government must understand its supportive and important role when plugged into the incident command system.

No. 3, Federal departments and agencies must involve fire and emergency services in conception, design, and review of all Federal plans relating to response to terrorist incidents. We strongly encourage FEMA support for the National Fire Academy's involvement with the Department of Justice and the Department of Defense on training issues.

PREPARED STATEMENT

I appreciate the opportunity to appear before you today and will be pleased to respond to any questions you may have.

Senator FAIRCLOTH. Thank you, Chief Fincher, and we will get to the questions later.

[The statement follows:]

PREPARED STATEMENT OF LUTHER L. FINCHER, JR.

STRENGTHENING THE LOCAL RESPONSE TO DOMESTIC TERRORISM

Good morning, Mr. Chairman. I am Luther Fincher, Chief of the Charlotte Fire Department in North Carolina. I am appearing today as second vice president of the International Association of Fire Chiefs. We greatly appreciate the opportunity to be here.

As we look forward to the twenty-first century, we see that the emergency services community faces new and difficult threats and challenges. These new hazards include many threats that have not been adequately dealt with in the past, including domestic terrorism.

The emergency services community must face the fact that American security, intelligence, and law enforcement will not always successfully prevent terrorist attacks. Therefore, the emergency services must be available when terrorist incidents occur. We must understand the ramifications of responding to terrorist incidents, which are totally different from traditional large-scale emergencies. The safety of emergency service providers will be at stake and must be an early consideration. The media will also take an active interest in incidents, from start to finish. Our customers have very high expectations of government in terrorist situations, and they demand extraordinary effort.

The federal government depends directly on local emergency service providers and their actions during the initial emergency phase of a terrorist incident. There are many eyes watching. Emergency managers, law enforcement personnel, firefighters, and emergency medical providers should be aware and prepared for this.

The role of first responders

When an act of terrorism occurs, the local fire and emergency service organizations alone respond immediately to deal with the incident and begin mitigation. Their operations in the first two or three hours will largely determine the number of lives saved and the eventual outcome of the incident. Congress and the federal government must clearly understand the role of the local responder. In almost all cases, the federal assets responding to an incident will not arrive until six to eight hours have passed, well after the most critical period. For the record, the International Association of Fire Chiefs terrorism response timeline shows the anticipated response of emergency forces. It clearly demonstrates that local first responders are unassisted for the most critical hours.

This is the point at which public health is most vulnerable. The local healthcare system must respond to treat patients while ensuring that first responders and its own workers do not become victims as well. Time will be of the essence; public health systems must be prepared to react without outside assistance. Decontamination policies, procedures, and facilities must be available, along with sufficient supplies of drugs and antidotes for whatever nuclear, biological, or chemical agent is present. The need and challenge is enormous.

Federal response plans regarding terrorism usually describe two roles—crisis management and consequence management. Crisis management deals with the enormous task of trying to prevent an incident from occurring. Consequence management concerns with planning for an incident before it occurs, then for recovery and rehabilitation after the event.

Let me point out a third area—the area called “local emergency response” immediately after the event. “Local emergency response” fits between crisis and consequence management. It begins at the point immediately following notification of the terrorist act. “Local emergency response” is that intense and vivid period of several hours when local first responders cope with the aftermath of a major incident. It is that time when local first responders work alone.

The role of Federal responders

In 1996, Congress passed two laws regarding acts of terrorism: The Antiterrorism and Effective Death Penalty Act and the Nunn-Lugar-Domenici provisions of the

Department of Defense Authorization. Both these important laws contain provision designed to help prepare local fire and emergency response organizations to deal with acts of terrorism. My testimony will focus on the policy issues which Congress must address to ensure that the administration delivers what is truly needed by American's fire and emergency services.

Department of Defense

In November 1997, Secretary of Defense William Cohen announced he was significantly enhancing the role of the National Guard to work with other federal agencies and state and local officials. He recently announced establishment of the Consequence Management Program Integration Office to oversee the activities of the National Guard and reserve components. We welcome this news, as the National Guard, while military, is controlled by state government and accessible at the local level. In planning a role for the National Guard and the reserve component, the federal government must acknowledge that the military will be a supportive asset for the incident commander, who most likely will be the municipal or volunteer fire chief. We applaud the National Guard for its continuing effort to work closely in the IAFC and the fire service as it enhances its mission for maximum effectiveness at the local level. However, federal assets—military, law enforcement, emergency management—must understand that they will necessarily be in a support role.

We request that the authority enhancing the current role of the National Guard to support local first responders be clearly defined. We need a "wiring diagram" of how federal assets are requested. What is the federal 911 number? How is it activated? Who determines what assets will be sent? What are the defined roles for each federal agency dispatched? Do they understand that they will report to the local incident commander for assignment? The answers to these questions must be understood and agreed upon by all parties. There can be no hesitation or confusion about any of this after an incident occurs.

Department of Justice

The IAFC has a close relationship with the Bureau of Justice Assistance (BJA) and the FBI. Nancy Gist, Butch Straub, and Andy Mitchell of BJA have done an excellent job working with the fire service to produce excellent training materials. First was an awareness training package which has already trained 8,000 firefighters. 68,000 are expected to be trained by June 1999. Additionally, more than 80,000 videotapes warning first responders about the dangers of secondary bombs have been distributed to fire, police, and EMS organizations. The BJA program has been so successful because it was developed in close cooperation with the National Fire Academy (NFA) to ensure its acceptance by the fire service. The key role of the National Fire Academy in preparing fire and emergency service leaders to respond to terrorism must be recognized and enhanced to increase its capability.

The IAFC has also found the FBI to be most helpful to the fire service as we prepare for terrorism. Specifically, we have excellent communication links with Bob Blitzer, Rinaldo Campana, and Barbara Martinez of the Domestic Terrorism and WMD Sections. We enjoy a high level of responsiveness and a willingness to work together in coordination of our efforts, and we plan to enhance this relationship in the future.

The incident command system

To quote from the report prepared by the DOD Tiger Team dated January 1998, "Local response to an emergency situation uses the Incident Command System (ICS) to ensure that all responders and their support assets are coordinated for an effective and efficient response. The Incident commander is normally the senior responder of the organization with the preponderance of responsibility for the event (e.g., fire chief, police chief, or emergency medical)." That is an excellent explanation. When federal assets arrive, ICS will be in place. They will be plugged into that system by the Incident Commander. Therefore, there is an urgent need for all federal agencies which respond to emergencies to adopt the National Fire Academy's Incident Command System.

Training and equipment

Both the Antiterrorism and Effective Death Penalty Act and Nunn-Lugar-Domenici contain provisions for training and equipping first responders. Congress has identified these as the two key roles for the federal government in assisting first responders to deal with acts of terrorism. Indeed, they are the two crucial elements for which the fire and emergency services look to the federal government for assistance. Both programs are important, necessary, and beneficial, but both can be improved. There needs to be better coordination between the Department of Justice

and the Department of Defense and the Federal Emergency Management Agency (FEMA). Congressional oversight is required.

A national domestic preparedness consortium has been formed to provide operational training, exercises, tests, and evaluation for first responders and municipal leaders. This consortium consists of the National Exercise Test and Training Center—Nevada Test Site, the National Emergency Response and Rescue Training Center—Texas A&M University, the National Center for Domestic Preparedness—Ft. McCellan, AL, National Center for Bio-Med Research and Training—Louisiana State University, and the National Energetic Materials Research and Testing Center—New Mexico Institute of Mining and Technology. These training and exercise areas and supporting organizations are important in preparing first responders to deal with acts of terrorism. The IAFC endorses the consortium and recommends continuing support from Congress as a matter of policy.

Training must be expanded beyond the 120 most populous jurisdictions targeted by DOJ and DOD. Strategic and critical American infrastructure—such as water, electric power, and telecommunications sites—are often located outside major metropolitan areas. These areas are protected by combination career and volunteer departments and by all-volunteer departments. Congressional mandate must direct that federal training reach the fire and emergency services nationwide. The resident and non-resident programs of the National Fire Administration offer an excellent existing delivery system that can and should be utilized to the maximum extent possible.

On the equipment issue, there is a clear and demonstrated need for sophisticated detection equipment. Firefighters need to know what they are facing—what chemical or biological agent. First, this information is necessary to protect ourselves and, second, to determine the correct strategy and tactics to deal with the incident. When such equipment is made available to first responders, provision must be made for training on its use, maintenance, spare parts, and future upgrades. This cannot be a one-shot deal but rather a continuing partnership between the federal government local fire and emergency responders.

There is also a need to assist local response agencies acquire appropriate personal protective equipment. Local fire departments simply do not have the resources to purchase all the protective equipment necessary to deal with a large-scale chemical or biological attack. Federal assistance is vital.

Another essential equipment need is the ability to engage in a large-scale decontamination effort. Some federal organizations, such as the Marine Corps' Chemical Biological Response Force, have some decontamination capabilities. However, they can only be effective when pre-positioned in anticipation of a specific event. The effectiveness of the capabilities are greatly diminished when geography dictates a response time of six to eight hours. Therefore, local first responders and public health providers must have policies, procedures, and facilities in place to deal with any nuclear, biological, or chemical agent that may be used.

Hospital capability

In a terrorist incident, the fire and emergency services will be responsible for triage, emergency medical treatment, and transportation of the sick and wounded. A large-scale WMD incident will sorely test even the largest community's ability to deal with mass casualties. Congress needs to closely examine the ability of hospitals to deal with large numbers of victims. Drug and antidote caches, decontamination facilities, and hospital pre-plans must be a focus of congressional inquiry and policy. Veterans Administration Hospitals should be considered for an important role.

Wireless radio communications

In 1996, the Public Safety Wireless Advisory Committee submitted its report to the Federal Communications Commission. One of its key recommendations was that the FCC set aside 2.5 MHZ of spectrum for interoperability. We need Congress to push for the policy to direct the FCC to establish several frequency ranges for interoperability purposes. In the World Trade Center and Oklahoma City incidents, the inability of the first responder agencies to communicate with each other and then with other levels of government severely hampered effective operations. This problem must be corrected.

CONCLUSION

In conclusion, I would like to leave you with several recommendations.

—The fire and emergency services need assistance from the federal government in the areas of training, detection equipment, personal protective equipment, and mass decontamination capabilities.

- Congress must recognize and direct federal agencies to organize their various missions and objectives with the clear understanding that, once a terrorist event occurs, the local first responders will be on the scene and operating in six minutes while federal assets will not arrive for six hours. The federal government must understand completely its supplemental, supportive role to the local incident commander.
- Fire and emergency services must be involved in the conception, design, and review of all federal plans relating to response to terrorist incidents. We currently work with the Bureau of Justice Assistance, Federal Bureau of Investigation, and the National Guard. These relationships should continue and should be a matter of congressional policy. We also strongly encourage FEMA support for the National Fire Academy's involvement with DOJ and DOD on fire service training issues.

Thank you for the opportunity to appear before you today. I will be pleased to respond to any questions you may have.

STATEMENT OF ROBERT KNOUSS, M.D., DIRECTOR, OFFICE OF EMERGENCY PREPAREDNESS, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Senator FAIRCLOTH. Our second witness will be Dr. Robert Knouss.

Dr. Knouss, is the Director of the Office of Emergency Preparedness in the Department of Health and Human Services. Dr. Knouss is a graduate of the University of Pennsylvania School of Medicine and has served in the Public Health Service in positions at the National Institute of Health and the Office of Refugee Health.

Dr. Knouss served as a Deputy Director of the Pan-American Health Organization for 10 years before returning to the Department of Health and Human Services.

Dr. Knouss also served as staff for the Senate Labor and Human Resources Committee.

Thank you, Dr. Knouss, and welcome.

Dr. KNOUSS. Thank you very much, Senator.

As you mentioned, my name is Dr. Robert Knouss. I am Director of the Office of Emergency Preparedness, and I am pleased to have this opportunity to comment and testify before you today.

The Office of Emergency Preparedness is responsible for coordinating HHS' continuity of Government, continuity of operations, and the provision of public health and medical services following emergencies and disasters that sufficiently degrade local capacity as to require national assistance. In this role we also work with other Federal agencies and the private sector to develop capabilities and capacities for responding to the health and medical needs of affected populations.

HHS is actively participating in the Department of Justice led effort to develop a 5-year interagency counterterrorism and technology plan, and that is a mouthful. This effort will address specific strategies and requirements for all agencies involved in the counterterrorism effort.

I am also the Director of the National Disaster Medical System, which is a partnership between the Department of Defense, the Department of Veterans Affairs, Federal Emergency Management Agency, and our own Department, as well as the private sector. This system can provide medical response to an affected area, evacuate patients, and provide definitive care if local and State resources are overtaxed. Under the Federal response plan, the National Disaster Medical System [NDMS], assets are incorporated into Emergency Support Function No. 8, Health and Medical Serv-

ices, and have been deployed to a wide variety of emergencies, such as natural disasters, plane crashes, and terrorist incidents.

The Sarin gas attack on the Tokyo subway system and the Oklahoma City bombing of the Alfred P. Murrah Federal Building left the world shocked by these senseless and horrific acts of terrorism. One of our greatest challenges is addressing the complex preparedness issues posed by a terrorist use of a weapon of mass destruction on civilian populations. The human health impact of such a release or detonation is the primary consequence of such an attack.

HHS is taking a systems approach to building response capability and capacity at the local, State, and Federal levels. Our counterterrorism strategy includes the following key elements: Enhancing local resources because disaster response in this country begins at the local level, as the chief has just indicated; developing partnerships to improve local and State health and medical system coordination and capability to respond effectively; and improving Federal health and medical capability to rapidly augment State and local responses. Our resources include those of the National Disaster Medical System.

As part of this system, we have developed specialized national medical response teams located in Washington, DC, Winston-Salem, Denver, and Los Angeles that can augment local resources in the event of a WMD threat or event. Instances where these teams have been used include in response to the bombing in Centennial Olympic Park, prepositioned to respond if needed during the Summit of the Eight last year in Denver, during the inauguration in 1997 here in Washington, DC, and in the Capitol here in this area during the State of the Union Address this year. It was also one of these teams, the one in Winston-Salem, that responded under State auspices to the event that occurred earlier this year in Charlotte, NC.

In creating these resources, we have not been alone. Some of the key HHS agencies with which we have been working very closely to address counterterrorism include the Centers for Disease Control and Prevention, the Agency for Toxic Substances and Disease Registry, FDA, and the NIH. External to HHS, we have been working with other Federal departments and agencies, the National Academy of Sciences, and local and State governments, as well as with nationally recognized individual experts.

We have also supported 27 major metropolitan areas for the development of local metropolitan medical strike team systems. These enhancements to existing local response systems are designed to provide initial onsite response and provide for safe patient transportation to hospital emergency rooms for treatment in the event of a WMD terrorist attack. These systems are characterized by specially trained responders for on-site triage and initial medical treatment, specialized pharmaceuticals and decontamination equipment, enhanced emergency medical transportation, definitive hospital care, and the provision of assistance from the National Disaster Medical System, if needed. Our plans are to continue developing local MMST systems in conjunction with the Domestic Preparedness Program's 120-city initiative. Further system development is necessary to assure adequate surveillance, laboratory support, and

pharmaceutical distribution systems in the event of a biological weapon release.

The program of enhanced preparedness that the President called for in his Naval Academy commencement speech on May 22 and his recent signing of Presidential Decision Directive No. 62 will strengthen our Nation's defenses against the growing threat of unconventional attacks against the people of the United States. This directive designates HHS as the lead Federal agency in support of FEMA to plan and prepare a national response to medical emergencies arising from the terrorist use of weapons of mass destruction. We will be supported by other Federal agencies in this effort, and together we plan to continue to provide enhanced local response through the strengthening of local systems and the provision of Federal supporting teams, if necessary, for the prevention, detection, identification, and public health response to the release of a weapon of mass destruction.

Of significant concern is how best to protect our civilian population from biological weapons. In response to the President's directive, our Department is exploring a range of approaches for upgrading our public health systems for detection and warning and for providing medical care for massive numbers of affected people. We are examining a broad spectrum of needs that includes research and development, pharmaceutical stockpiles, public health surveillance, and response capabilities.

PREPARED STATEMENT

Secretary Shalala has recently requested that the Assistant Secretary for Planning and Evaluation convene a working group to develop an HHS strategic plan for strengthening and expanding our role in the Governmentwide bioterrorism effort. Implementation of the plan and oversight of the resulting activities will be the responsibility of the Assistant Secretary for Health and the Surgeon General.

I want to thank you very much, Senator, for this opportunity to appear before you today on this very important issue, and I would be glad to eventually answer any questions you may have.

Senator FAIRCLOTH. Thank you, Dr. Knouss.

[The statement follows:]

PREPARED STATEMENT OF ROBERT KNOUSS

Good afternoon. I am Dr. Robert Knouss, Director of the Office of Emergency Preparedness in the Department of Health and Human Services (HHS). I am pleased to have the opportunity to appear before the Senate Appropriations Subcommittee on Labor, Health and Human Services and Education on the very important topic of the Nation's Public Health Infrastructure Regarding Epidemics and Bioterrorism.

The Office of Emergency Preparedness is responsible for coordinating HHS' continuity of government, continuity of operations, and the provision of public health and medical services following emergencies and disasters that sufficiently degrade local capacity as to require national assistance. In this role we also work with other federal agencies and the private sector to develop capabilities and capacities for responding to the health and medical needs of affected populations.

HHS is actively participating in the Department of Justice led effort to develop a Five-Year Inter-Agency Counter-terrorism and Technology Plan. This effort will address specific strategies and requirements for all agencies involved in the counter-terrorism effort.

I am also the Director of the National Disaster Medical System (NDMS) which is a partnership between the Department of Defense, the Department of Veterans

Affairs, the Federal Emergency Management Agency, HHS and the private sector. This system can provide medical response to an affected area, evacuate patients, and provide definitive care if local and state resources are overtaxed. Under the Federal Response Plan, NDMS assets are incorporated into Emergency Support Function No. 8, Health and Medical Services, and have been deployed to a wide variety of emergencies such as natural disasters, plane crashes, and terrorist incidents.

The Sarin gas attack on the Tokyo subway system and the Oklahoma City bombing of the Alfred P. Murrah Federal Building left the world shocked by these senseless and horrific acts of terrorism. One of our greatest challenges is addressing the complex preparedness issues posed by a terrorist use of a WMD on civilian populations. The human health impact of such a release or detonation is the primary consequence of such an attack.

HHS is taking a "systems" approach to building response capability and capacity at the local, state and federal levels. Our counter-terrorism strategy includes the following key elements: Enhancing local resources because disaster response in this country begins at the local level; developing partnerships to improve local and state health and medical system coordination and capability to respond effectively; and improving federal health and medical capability to rapidly augment state and local responses. Our resources include those of the National Disaster Medical System.

As part of this system, we have developed specialized national medical response teams (located in Washington, D.C., Winston-Salem, Denver, and Los Angeles) that can augment local resources in the event of a WMD threat or event. Instances where these teams have been used include: (1) in response to the bombing in Centennial Olympic Park; (2) pre-positioned to respond if needed during the Summit of the Eight last year in Denver; (3) during the Inauguration in 1997; and (4) in the Capitol during the State of the Union Address this year. It was also one of these teams, the one in Winston-Salem, that responded under State auspices, to the event that occurred earlier this year in Charlotte, North Carolina.

In creating these resources, we have not been alone. Some of the key HHS agencies with which we have been working very closely to address counter-terrorism issues include the Centers for Disease Control and Prevention, the Agency for Toxic Substances and Disease Registry, the Food and Drug Administration, and the National Institutes of Health. External to HHS we have been working with other federal departments and agencies, the National Academy of Science's Institute of Medicine, and local and state governments, as well as with nationally recognized individual experts.

We have also supported 27 major metropolitan areas for the development of local Metropolitan Medical Strike Team Systems. These enhancements to existing local response systems are designed to provide initial on-site response and provide for safe patient transportation to hospital emergency rooms for treatment in the event of a WMD terrorist attack. These MMST Systems are characterized by specially trained responders for on-site triage and initial medical treatment; specialized pharmaceuticals and decontamination equipment; enhanced emergency medical transportation; definitive hospital care; and the provision of assistance from the National Disaster Medical System, if needed. Our plans are to continue developing local MMST Systems in conjunction with the Domestic Preparedness Program's 120-city initiative. Further system development is necessary to assure adequate surveillance, laboratory support and pharmaceutical distribution systems in the event of a biological weapon release.

The program of enhanced preparedness that the President called for in his Naval Academy commencement speech on May 22nd, and his recent signing of Presidential Decision Directive 62, will strengthen our nation's defenses against the growing threat of unconventional attacks against the people of the United States. This directive designates HHS as the lead Federal agency, in support of FEMA, to plan and prepare a national response to medical emergencies arising from the terrorist use of weapons of mass destruction. We will be supported by other Federal agencies in this effort. Together we plan to continue to provide enhanced local response through the strengthening of local systems and the provision of Federal supporting teams, if necessary—for the prevention, detection, identification and public health response to the release of a weapon of mass destruction.

Of significant concern is how best to protect our civilian population from biological weapons. In response to the President's directive, HHS is exploring a range of approaches for upgrading our public health systems for detection and warning and for providing medical care for massive numbers of affected people. We are examining a broad spectrum of needs that includes research and development, pharmaceutical stockpiles, public health surveillance, and response capabilities.

Secretary Shalala recently requested that the Assistant Secretary for Planning and Evaluation convene a working group to develop a HHS strategic plan for strengthening and expanding our role in the Government-wide bioterrorism effort. Implementation of the plan and oversight of the resulting activities will be the responsibility of the Assistant Secretary for Health and Surgeon General.

Thank you for this opportunity to discuss our counter-terrorism initiatives with you. I would be glad to answer any questions.

STATEMENT OF JAMES M. HUGHES, M.D., DIRECTOR, NATIONAL CENTER FOR INFECTIOUS DISEASES, CENTERS FOR DISEASE CONTROL AND PREVENTION, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Senator FAIRCLOTH. Our third witness will be Dr. James Hughes. Dr. Hughes is Assistant Surgeon General and Director of the National Center for Infectious Diseases at the Centers for Disease Control. Dr. Hughes is a physician and a graduate of Stanford University. He completed a fellowship in infectious diseases at the University of Virginia and is one of the world's foremost experts on infectious diseases. Dr. Hughes, we thank you for coming and welcome you here. You may begin your testimony.

Dr. HUGHES. Good afternoon. Thank you for that kind introduction, Senator.

I am Dr. James Hughes, Director for the National Center for Infectious Diseases at the Centers for Disease Control and Prevention. Thank you for the opportunity to be here with Dr. Richard Jackson, who is Director of CDC's National Center for Environmental Health, to discuss the response to disease outbreaks caused by biological and chemical terrorism. I will focus on terrorist events involving biological agents, and Dr. Jackson will address chemical events.

The bombings of the World Trade Center in New York and the Federal Building in Oklahoma City taught us how vulnerable we are to terrorist attacks. A biological or chemical attack used to be considered unlikely but now seems entirely possible, given the availability of information on how to prepare such weapons and activities by groups such as Aum Shinrykyo which released nerve gas in Tokyo's subway and experimented with biological weapons.

An attack involving a biological agent may not be immediately detectable because of the delay between exposure and onset of illness which for infectious diseases can range from several hours to several weeks. For example, if the organism that causes anthrax were released in an airport, some victims might be in other cities or even other countries before they experience symptoms. An attack involving an organism such as those causing plague or smallpox that is spread from person to person could lead to a second and third wave of illness and involve health care workers and emergency responders.

In his recent address at the U.S. Naval Academy, President Clinton announced his intention to upgrade our public health systems for disease detection and early warning. Many Federal agencies are collaborating to formulate policies and strategic plans to ensure prompt and effective responses to terrorist attacks, and CDC is working with Dr. Knouss in the Office of Emergency Preparedness and other Government entities, including FDA, DOD, FEMA, and the FBI.

Protection against terrorism requires a strong public health system at the local, State, and national level. CDC's plan, Addressing Emerging Infections Disease Threats: A Prevention Strategy for the United States, launched an effort to rebuild the public health system's capacity to detect and respond to infectious diseases. Through fiscal year 1998, \$59 million have been appropriated to implement the plan incrementally.

CDC will issue an updated version of this plan later this year which, like the 1994 plan, will emphasize that we must be prepared for the unexpected, whether it be an influenza pandemic, naturally occurring outbreaks of food-borne disease or drug-resistant infections or the deliberate release of anthrax by a terrorist.

The cause of an outbreak is not always clear at first. For example, in 1993 a physician with the Indian Health Service in the Southwest reported that two previously healthy young people had died from acute respiratory failure, and additional cases were subsequently identified by other physicians. Investigation revealed that the outbreak was not caused intentionally, but rather by a previously unrecognized hantavirus spread by rodents.

Senator FAIRCLOTH. Spread by what, Doctor?

Dr. HUGHES. Rodents, deer mice actually. Critters, we say. [Laughter.]

However, the techniques required to diagnose this outbreak were similar to those that would be needed to respond to a bioterrorist attack.

Four components of the response to disease outbreaks are important to preparedness to address acts of terrorism in a coordinated fashion, starting with detection of unusual events. After a bioterrorist attack, initial disease detection is likely to take place at the local level, so it is essential to work with the medical community including emergency medical departments, poison control centers, and emergency responders. A recent Institute of Medicine report recommended expanding CDC's emerging infections initiative to improve State and local infrastructure.

The second component is investigation and response which are also likely to take place at the local level initially, as we have heard.

Third, rapid diagnosis will be critical so prevention and treatment measures can be implemented quickly. Because the agents most likely to be used as bioweapons are not currently major public health problems in the United States, we have limited biocontainment laboratory space and surge capacity to work with them. In addition, future events could involve organisms that have been genetically engineered to increase their virulence, manifest antibiotic resistance, or evade natural or vaccine-induced immunity.

Finally, communications are crucial as delays will increase the probability that more people will be exposed.

PREPARED STATEMENT

In conclusion, a strong and flexible public health infrastructure is the best defense against any disease outbreak, whether naturally occurring or intentionally caused. CDC's ongoing efforts to strengthen disease surveillance and response at the local, State,

and Federal levels can complement efforts to detect and contain diseases caused by bioweapons.

Thank you very much for your attention. I will be happy to answer any questions.

Senator FAIRCLOTH. Thank you, Dr. Hughes.

[The statement follows:]

PREPARED STATEMENT OF DR. JAMES M. HUGHES

I am Dr. James M. Hughes, Director, National Center for Infectious Diseases, Centers for Disease Control and Prevention (CDC). With me today is Dr. Richard Jackson, Director of CDC's National Center for Environmental Health. We are here to discuss a very important topic: the public health response to disease outbreaks caused by biological and chemical terrorism. Our testimony summarizes the present system of public health surveillance and control at the state, local, and Federal levels. I will focus primarily on terrorist events that involve biological agents, and Dr. Jackson will address events that involve chemical agents.

U.S. VULNERABILITY TO TERRORISM

The bombings of the World Trade Center in New York and the Federal building in Oklahoma City taught us how vulnerable we are to terrorist attacks within our own borders, even in times of peace. We know that in addition to bombs, today's terrorists can choose among many highly dangerous agents, including biological and chemical agents.

An attack with a biological or chemical weapon used to be considered very unlikely, but now seems entirely possible. Many experts believe that it is no longer a matter of "if" but of "when" such an attack will occur. They point to the accessibility of information on how to prepare biologic and chemical weapons (on the Internet and elsewhere) and to activities by groups such as Aum Shinrykyo, which, in addition to releasing nerve gas in Tokyo's subway, experimented with botulism and anthrax. Moreover, the Federal Bureau of Investigation (FBI) recently investigated a situation in Las Vegas where an individual was in possession of the organism causing anthrax. Although the individual had an attenuated strain of anthrax used in an animal vaccine rather than a virulent strain, the incident provided another reminder of how easily a terrorist might cause serious illness and panic in a U.S. city.

The release of a biological agent or chemical toxin may not have an immediate impact because of the delay between exposure and onset of illness, or incubation period. For example, when people are exposed to a pathogen like anthrax or smallpox, they will not know that they have been exposed, and they may not feel sick for some time. The incubation period may range from several hours to a few weeks, depending on the microbe and the dosage. If a group of people in an airport were exposed to the organism that causes anthrax in an aerosolized form, some of them might be far away—perhaps even overseas—by the time they experienced the first symptoms.

Moreover, if an attack involved an organism like those causing plague or smallpox that is spread from person to person, there could be a second or third wave of illness, and health care workers treating patients would be at risk of infection. Each wave of illness could be larger than the one before, as more and more people were exposed. In the best-case scenario, an observant health worker would recognize that something out of the ordinary has occurred and alert public health authorities. In the worst-case scenario, the first wave of cases may not appear to be connected—or may be mistaken for other diseases—and the outbreak would continue for some time before the diagnosis is made and action is taken to contain it. We may have only a short window of opportunity—between the time the first cases are identified and a second wave of people become ill—to determine that an attack has occurred, to identify the organism, and to prevent further spread.

Most people agree that investing in defense is imperative, even at a time when the average American is not threatened by war, but defense is not solely through military means. As the anthrax example illustrates, the initial response to a bioterrorist act is likely to be made by the public health community rather than by the military. Protection against terrorism requires a strong public health system at the local, state, and national levels.

PLANNING AND PREPAREDNESS

Many Federal agencies are working together to formulate policies and strategic plans to ensure prompt and effective responses to terrorist attacks that employ biological or chemical agents. In his commencement address at the U.S. Naval Academy on May 22, 1998, President Clinton announced his intention to upgrade our public health systems for disease detection and early warning, both to improve our preparedness against terrorism and to help us cope with naturally occurring infectious disease outbreaks. CDC and other agencies are assessing what is necessary to implement such an upgrade.

CDC also is participating in a working group on domestic and international surveillance for bioterrorism, conducted under the auspices of the Emerging Infections Task Force of the Committee on International Science, Engineering, and Technology (CISET), National Science and Technology Council. The Task Force is based in the White House Office of Science and Technology Policy (OSTP). In addition, CDC works on bioterrorism issues with the Office of Emergency Preparedness (OEP), OSTP, and the National Security Council.

Interagency planning will be especially important to ensure the availability of medical supplies needed to respond to terrorist acts. In addition, CDC, the National Institutes of Health (NIH), DOD, and other agencies need to collaborate on a research agenda to address scientific issues related to bioterrorism.

CDC'S ROLE

To respond effectively to the threats of bioterrorism and epidemics, CDC and State and local health departments must act together as they do in other areas of public health. CDC and State and local health departments are the Nation's three-part shield of defense against public health threats of all kinds. Public health response to terrorism requires recognition of the unique, yet interdependent, roles that local, State, and Federal agencies play.

As the Nation's prevention agency, CDC's mission is to monitor the health of the U.S. population and investigate and contain disease outbreaks, including those that are due to deliberate acts of terrorism. In 1994, CDC issued a strategic plan, *Addressing Emerging Infectious Disease Threats: a Prevention Strategy for the United States*, which launched a major effort to rebuild the component of the U.S. public health system that protects U.S. citizens against infectious diseases. The plan focuses on four goals, each of which has direct relevance to preparedness for bioterrorism: disease surveillance and outbreak response; applied research to develop diagnostic tests, drugs, vaccines, and surveillance tools; disease prevention and control; and infrastructure and training. Through fiscal year 1998, \$59 million has been appropriated to implement the plan incrementally, with the help of many partners, beginning with the most critical areas and programs, and the President's fiscal year 1999 budget includes an additional \$20 million to continue this effort.

CDC intends to issue an updated version of the plan later this year. Like the 1994 plan, the new plan emphasizes that we must always be prepared for the unexpected—whether it be a naturally occurring influenza pandemic, multiply antibiotic resistant infections, or the deliberate release of anthrax by a terrorist.

INVESTIGATING DISEASES OF UNKNOWN CAUSE

CDC is often asked to assist State public health authorities or foreign health ministries when the cause of an outbreak is unknown. Early in an investigation, it may not be possible to know whether an outbreak is caused by an infectious agent or a chemical toxin. For example, a recent outbreak of acute kidney failure in children in Haiti was thought to be infectious, but investigation revealed that the illnesses were caused by chemical contamination of a medication used in children.

In recent years, it has become more common for outbreak investigators to consider the possibility of a terrorist event when they investigate the cause of an outbreak. This possibility arose during the investigations of the 1993 outbreak of hantavirus pulmonary syndrome in the United States, the 1994 outbreak of plague in India, and even the 1995 outbreak of Ebola hemorrhagic fever in the Democratic Republic of the Congo (then Zaire).

Whether an outbreak has a natural or man-made cause is not always clear in the first stages of an epidemiologic investigation. This point is well illustrated by what happened during the first days of the hantavirus outbreak in 1993. In May of that year, a physician at the Indian Health Service (IHS) in a southwestern State reported that two previously healthy young people had died from acute respiratory failure. Over the next few days, additional cases were identified by the State medical examiner's office and by other IHS physicians. The epidemiologists ruled out

leakage of an air-borne toxic chemical from a nearby munitions depot. Microbiologists conducted laboratory tests for pneumonic plague, inhalational anthrax, and pulmonary tularemia, and were able to rule out these diseases. These three infections, though rare, occur sporadically in the southwestern United States, where they are endemic in the local animal populations. All three could have been biological weapons. Throughout the investigation, there were rumors that a biological agent had been released as an act of genocide against the Navajo people who lived in the affected area.

As public health investigators proved, the outbreak was not caused by a chemical or biological weapon, but by a newly identified, highly lethal virus spread by rodents. Fortunately, CDC's application of sophisticated molecular biologic techniques led to the rapid identification of a previously unrecognized hantavirus as the cause of this illness five months before the virus was finally cultured using conventional techniques. The investigative skills, diagnostic techniques, and physical resources required to detect and diagnose this outbreak were similar to those that would be needed to identify and respond to a bioterrorist attack.

Our experience with the hantavirus outbreak shows that a strong public health system for disease surveillance, outbreak investigation, and laboratory diagnosis is essential to protect the nation. With each outbreak investigation, public health personnel become better trained and more experienced in addressing cases of unexplained illness.

PUBLIC HEALTH RESPONSE TO TERRORISM

Four components of the public health response to disease outbreaks are important to U.S. preparedness to address acts of terrorism in a coordinated fashion: detection of unusual events, investigation and containment of potential threats, laboratory capacity, and coordination and communication.

Detection of unusual events.—The public health effort to combat infectious diseases in the United States is based on the early detection of unexpected cases or clusters of illnesses, so that small outbreaks can be stopped before they become big ones. In its recent interim report, "Improving Civilian Medical Response to Chemical or Biological Terrorist Incidents," the Institute of Medicine (IOM) cites public health departments' existing mission to promptly identify and control infectious disease outbreaks. The IOM report recommends expansion of CDC's emerging infections initiative as a means of improving State and local surveillance infrastructure.

In the case of a bioterrorist attack, the initial detection of a disease is likely to take place at the local level. It is essential to work with members of the medical community who may be the first to recognize unusual diseases, and with State and local health departments, who are most likely to mount the initial response—especially if the intentional nature of the outbreak is not immediately apparent. Strong communication links between clinicians, emergency responders, and public health personnel are important.

As mentioned, an astute physician—on the basis of only two unusual cases—alerted health authorities to what turned out to be an outbreak of hantavirus pulmonary syndrome. In contrast, during the 1995 Ebola outbreak in Zaire, there was no surveillance system in place, and the outbreak was not detected until at least two waves of infection had passed and many people, including a large number of health care workers, had died. Thus, early detection and response is critical.

As part of the implementation of CDC's plan for emerging infections, CDC has established the Epidemiologic and Laboratory Capacity (ELC) program to help State and large local health departments develop the skills and resources to address whatever unforeseen infectious disease challenges may arise in the twenty-first century. One of the specific aims of the ELC program is the development of innovative systems for early detection and investigation of outbreaks. By July, thirty State and large local health departments will receive support from the ELC program. CDC has also entered into agreements with seven State health departments, in collaboration with local academic, government, and private sector organizations, to establish Emerging Infections Program (EIP) sites that conduct active, population-based surveillance for selected diseases, as well as for unexplained deaths and severe illnesses in previously healthy people.

CDC has also helped establish sentinel surveillance systems that involve local networks of clinicians and other health care providers. One such network includes emergency departments at eleven hospitals in large U.S. cities. Another includes fourteen travel medicine clinics in the United States, plus seven overseas. A third network includes over 500 infectious disease specialists throughout the country. CDC is using these and other provider-based networks to alert and inform the medi-

cal community so that health workers can help recognize and assess unusual infectious disease threats.

Investigation and response.—As is the case for any naturally-occurring infectious disease outbreak, the initial response to an outbreak caused by an act of bioterrorism is likely to take place at the local level. In the most likely scenario, CDC—as well as DOD and security agencies—will be alerted only after a State or local health department has recognized a cluster of cases that is highly unusual or of unknown cause. CDC is working with State and large local health departments through the ELC program and other efforts to provide tools, training, and financial resources for local outbreak investigations.

CDC's Epidemic Intelligence Service (EIS) trains personnel to respond to outbreaks and other disaster situations to aid state and local officials in the identification of potential causes and implement appropriate solutions. It is interesting to remember that the EIS was established during the Cold War in response to the threat of biological warfare. In addition, CDC trains Public Health Prevention Service (PHPS) specialists who can provide on-site programmatic support to extend the manpower of state and local public health staff.

Once the cause of a terrorist-sponsored outbreak has been determined, specific drugs, vaccines, and antitoxins may be needed to treat the victims and to prevent further spread. However, depending upon the pathogen that causes the outbreak, appropriate medical supplies may not be readily available since these organisms are uncommon causes of disease in the United States. This is an important issue that is being addressed collaboratively by a number of Federal agencies, including CDC, OEP, FDA, and other parts of the Department of Health and Human Services; DOD; FEMA and the Department of Veterans Affairs.

In his May 22 speech, the President also announced that the United States would create stockpiles of medicines and vaccines to protect our civilian population against biological agents our adversaries are most likely to develop. A number of Federal agencies are working collaboratively to address this important issue as well.

Laboratory support.—In the event of a bioterrorist attack, rapid diagnosis will be critical to the immediate implementation of prevention and treatment measures. However, because none of the biological agents considered most likely to be used as bio-weapons are currently major public health problems in the United States, we have limited capacity to diagnose them, either at the State and local or Federal level.

We must also prepare for the possible use of other agents as bioterrorist threats. This was illustrated by a 1984 foodborne outbreak of salmonellosis in Oregon caused by followers of Bhagwan Shree Rajneesh and a 1996 foodborne outbreak of shigellosis in Texas caused by a single perpetrator. Future events could involve organisms that have been genetically engineered to increase their virulence, manifest antibiotic resistance, or evade natural or vaccine-induced immunity.

In recent years, CDC has helped State health departments acquire the capacity to detect naturally occurring outbreaks of foodborne diseases. In 1997, the success of that effort was underscored when the Colorado State Health Department, using DNA fingerprinting techniques developed/standardized at CDC, detected a small cluster of cases of *E. coli* infection caused by consumption of a single brand of frozen hamburger patties. Twenty-five million pounds of ground beef were recalled, and a potential nationwide outbreak was averted. Providing state health departments with the capacity to detect outbreaks of diseases caused by terrorists may avert disasters with even greater potential to devastate our country.

Coordination and communications.—One of the major objectives in CDC's emerging infections plan is to improve CDC's ability to communicate with State and local health departments, U.S. quarantine stations, health care professionals, other public health partners, and the public. In the event of an intentional release of a biological agent, rapid and secure communications will be especially crucial to ensure a prompt and coordinated response. Each hour's delay will increase the probability that another group of people will be exposed, and the outbreak will spread both in number and in geographical range.

CDC may also need to communicate with WHO and with the ministries of health of other nations, especially if persons exposed in the United States have traveled to another country. Because of the ease and frequency of modern travel, an outbreak caused by a bioterrorist could quickly become an international problem.

CONCLUSION

In conclusion, a strong and flexible public health infrastructure is the best defense against any disease outbreak—naturally or intentionally caused. CDC's on-going initiatives to strengthen disease surveillance and response at the local, State, and Fed-

eral levels can complement efforts to detect and contain diseases caused by the biological agents that might be used as weapons.

Thank you very much for your attention. I will be happy to answer any questions you may have.

STATEMENT OF RICHARD JACKSON, M.D., M.P.H., DIRECTOR, NATIONAL CENTER FOR ENVIRONMENTAL HEALTH, CENTERS FOR DISEASE CONTROL AND PREVENTION, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Senator FAIRCLOTH. And now we will hear from Dr. Richard Jackson. Dr. Jackson is the Director of the Centers for Disease Control's National Center for Environmental Health in Atlanta.

Dr. Jackson received his medical training as a pediatrician at the University of California at San Francisco and further studied at the University of California at Berkeley. He currently serves on the Senior Health and Advisory Committee within the Department of Defense.

I welcome you, Dr. Jackson, and we will hear your testimony.

Dr. JACKSON. Thank you, Senator.

The Center for Environmental Health is a sister center to Dr. Hughes' Center for Infectious Disease. We do the non-infectious issues, such as disasters, including heat waves, tornadoes. We look at radiation hazards to the population. We were involved in the investigation following Three Mile Island, following Chernobyl, following weapons tests, around sites where nuclear weapons were being produced, looking at health effects in civilian communities. We monitor birth defects in the population and we monitor disabilities in the population.

But the primary activity that I would like to talk about today is monitoring chemical exposures in the population. We have at the National Center for Environmental Health the premier laboratory in the world for looking at chemicals in people. We do not look at chemicals in air, in water, in food, or in animals. We look at chemicals in people, and that is what we are good at.

We have worked for 20 years now with the Department of Defense assisting them in analysis of chemicals, for example, in veterans and in GI's. We were involved in the evaluation of the health effects in Bhopal, India 14 years ago where 3,000 people were killed, and one of my staff was in Tokyo following the Sarin gas episode looking at the health effects where 12 people died there.

My personal experience in this area was most dramatic with the spill in the Sacramento River where 35 miles of river—the fish and other animals were killed along the river and an entire community was sickened downwind from the Dunsmere spill episode. In such episodes, you do not know, initially when they start, whether you are dealing with a chemical or an infectious agent, and you do not know whether this is a random, accidental event or if it is a deliberate misdeed. There is one thing you always do know. You also know that you are going to have a lot of very worried people. You are going to have a lot of calls from the media. You are going to have a lot of calls from elected officials that want to know what is going on.

We were involved in the episode of the methyl parathion spraying in seven States around the Nation, including Mississippi and Illinois. This was an illegal insecticide that was being sprayed in

homes. At least 14,000 people were exposed to these chemicals because of this illegal use. A large number of people were made ill. It is reported that perhaps two people died from this episode. The question was whether a home was safe to go into, and just measuring a little bit of chemical off in one corner of the house was not going to tell you whether a child was safe in that house or not. What we needed was a special method to actually look at chemicals in people. In some cases we would decide the people had to get out of that house right away, be put in a motel for weeks at a time. That house needed to be sometimes ripped out completely and completely rebuilt. Other homes, no treatment was needed whatsoever. It was the monitoring of the people, measuring the chemical in the people in that home, that helped us decide what the follow-up should be for each of those homes for each of those 14,000 people.

The ability to analyze this chemical in the people, the methyl parathion, in the people saved 50 million dollars' worth of rehab and remediation work.

In the area of chemical terrorism, most people think that someone will drop like a stone when they are exposed to one of these chemicals. Cyanide, for example, people die almost immediately. But, in fact, for many of the chemicals that we would be worried about, there would be many people with much lower doses of exposure. There were 5,000 people that were concerned and injured in the Sarin episode in Tokyo who did not die. And there is every reason to believe—and a person testified, a doctor testified, before you about a month ago that said in Iraq people were exposed to complex mixtures of chemicals, not simply one chemical.

So, the important issue for the laboratory is knowing who was exposed and how much were they exposed to. This is the information that the public and the doctors want: Who was exposed and how much did they get. The site managers need this information and the people that have to look at this weeks later are going to need this information about the exposures.

The good news is the CDC lab can tell you about these individual chemicals. The bad news is we need a couple of tubes of blood oftentimes for each of these chemicals. It takes days and sometimes weeks, and each one of these is a special and expensive test.

There is a need for our ability to have a rapid toxic screen to look at a large number of chemicals relatively rapidly, to be able to turn that round, to give that information back to site managers, to give it back to the doctors who are caring for these people, and to develop the capacity within State and local health departments to do this analysis themselves.

PREPARED STATEMENT

We at the Center for Environmental Health are looking forward to working with our partners at this table and the rest of the people who will be testifying before you today on the importance of the laboratory in figuring out who was exposed and how much they were exposed to.

Thank you.

Senator FAIRCLOTH. Thank you, Dr. Jackson.

[The statement follows:]

PREPARED STATEMENT OF DR. RICHARD JACKSON

I am Dr. Richard J. Jackson, Director of the National Center for Environmental Health of the Centers for Disease Control and Prevention (CDC). I appreciate the opportunity to summarize CDC's role in responding to chemical terrorism. As a former State public health official, I have experienced first hand the panic, fear and chaos associated with disease outbreaks and disastrous events.

As Dr. Hughes summarized, CDC's mission is to monitor the health of the U.S. population and investigate and contain disease outbreaks, including those that are due to deliberate acts of terrorism. As with biological terrorist threats, CDC's response to chemical terrorism includes four components: surveillance and outbreak response; laboratory capacity to measure toxicants in the blood, serum or urine of people; disease prevention and control; and infrastructure and training. Whereas the Environmental Protection Agency has the lead for the effects of chemical toxicants on the environment, CDC's role pertains to the effects of chemicals on human health.

CDC responds to chemical emergencies, whenever and wherever they occur, whether the emergency is caused by an act of terrorism or an accidental release. Television has given us all the opportunity to see a glimpse of the serious impact both of these types of emergencies can have on the population of a city or country. Two such examples in recent years are the chemical plant explosion in Bhopal, India and the terrorist attack in the subway in Tokyo, Japan. In December 1984, an explosion at a chemical plant in Bhopal, India caused an extremely toxic substance to be released into the air in an area surrounding the plant—a densely populated part of the city. In this incident, an estimated 30 to 40 tons of the substance were released into the atmosphere during a 2- to 3-hour period, resulting in over 3,000 dead and 60,000 seriously injured of the more than 200,000 people exposed. In the second example, in March 1995, a terrorist group in Japan released Sarin gas (a nerve agent) into the air of Tokyo's subway system. Within 24 hours of the attack over 5,000 people had sought medical attention. By the end of the crisis almost a thousand people were identified as experiencing some health effects and 12 people died. In the end, it was only the inefficiency of the mechanism used to disperse the chemical agent that prevented casualties from being far worse.

The reason I have chosen to cite these two examples today is to point out the variability of the types of chemical emergencies that have occurred elsewhere and that could occur in the United States. There are three points I would like to make about the emergency response responsibilities and capabilities at the various levels of government: (1) the nation's public health system, health officials at the local, State, and federal levels, is a critical resource aimed at protecting the health of U.S. residents whenever a health emergency occurs; (2) CDC has the expertise and capacity to respond to many types of chemical emergencies; and (3) the Federal agencies tasked with responding to chemical emergencies are discussing ways to improve our response capabilities to better triage exposed populations and communicate with our partners, the media, and most importantly, the public.

PUBLIC HEALTH ROLE IN RESPONDING TO CHEMICAL EMERGENCIES

Terrorism is a community problem. Health decisions for the community in response to a terrorist event require the involvement of public health professionals from the local, state, and Federal levels. State and local public health officials will be among the first to respond to any chemical weapon attack, long before any Federal units are on the scene. It is these local public health professionals with whom CDC has had a long term relationship. It is CDC that State and local officials call upon for help and advice in any kind of public health emergency. And, it is the State and local public health professionals who work along side the local police, firefighters, and emergency medical personnel and who have the greatest impact on the health and safety of people in affected areas.

We, in public health, also have the responsibility to protect the community of emergency responders—so that they do not become victims as well. We have the responsibility to protect the community of exposed people—to carry out surveillance, to determine who has been exposed to toxic chemicals and at what level they have been exposed, to ensure that they receive appropriate care and treatment, and to create registries during the early stages of the event to allow for appropriate long term follow up. Lastly, we have the responsibility to protect the larger community impacted by a terrorist act—to calm the panicked and worried well with good scientifically based but understandable information and to help communities recover from the trauma of a terrorist act or chemical emergency. Experienced public health doctors, laboratorians, and epidemiologists are essential in helping communities to respond quickly and to sort out questions of exposure, treatment, and recovery.

CDC'S EMERGENCY RESPONSE CAPABILITIES

CDC has considerable experience working on all types of chemical emergencies. When a disaster or emergency occurs, CDC responds to requests for assistance from state or local agencies by helping to:

- Make a preliminary assessment of the situation either by telephone or by sending an emergency response coordinator or team to the site;
- Coordinate our activities with those of the local, state, and other federal personnel, including assistance to help protect the health and safety of emergency response teams;
- Provide assistance to help protect the health and safety of emergency response teams;
- Develop a strategy for dealing with the public health aspects of an emergency;
- Provide technical assistance in areas such as epidemiology, toxicology, and laboratory science;
- Perform any necessary laboratory tests, most of which are currently beyond the capacity of local, state, or university laboratory;
- Determine when protection, treatment, and prevention objectives are achieved; and
- Set up a program to deal with the recovery process.

Throughout the response process, CDC makes resources available to use in aiding both the short term response and the long term recovery of the community involved. We have state of the art communications equipment that allows us to provide a link between on-site and off-site responders. CDC has a staff of health communicators and educators, who are invaluable to our communications with the media and the affected and worried public. CDC has the experienced professionals, including doctors and epidemiologists, needed to triage victims, ensure medical treatment for those who are ill, and provide follow up for those who are at risk of disease. And, CDC's laboratory capacity is unique in the world in that it has the technology and highly trained professionals necessary to make measurements of chemical exposures in people.

One common thread in the laboratory component of the public health response to these tragedies is to determine what chemical agents were used, who has been exposed to the agents and to how much. This information is critical for appropriate medical treatment for those who have been exposed, and to allay the fears of those who have not been exposed.

CDC'S LABORATORY CAPACITY

CDC's environmental laboratory is unique in that it is the only laboratory that can accurately measure more than 200 toxicants (chemicals) in people, not simply in the environment. Such measurement is known as biomonitoring. Let me provide an example of the value of this information and how CDC's scientific capacity helped to address a recent chemical emergency involving the pesticide methyl parathion.

Methyl parathion is illegal for indoor pesticide use because it acts as a nerve agent. Though not as strong as the nerve agent used by terrorists to kill people on a Japanese subway in 1995, it affects people the same way.

Starting in the fall of 1996, seven states—Mississippi, Louisiana, Texas, Arkansas, Tennessee, Alabama, and Illinois—became aware that methyl parathion was being used indoors to control indoor pests. Two children died. Thousands of homes were affected. In order to take appropriate action, public health officials had to determine who had been exposed and to what extent. They also had to respond to a flood of calls from people who feared that methyl parathion had been sprayed in their homes.

State and local health officials asked CDC, the Agency for Toxic Substances and Disease Registry, and the Environmental Protection Agency to help with this emergency. To quantify human exposure to this deadly pesticide, CDC's Environmental Health Laboratory developed a mass spectrometry assay to measure a metabolite of methyl parathion in urine. Through this unique test, it was possible to determine the amount of exposure a person had to this nerve agent. State and other federal officials used CDC's test to determine who had been exposed, how much, who was at greatest health risk, and whether homes needed to be evacuated and remediated. To date, more than 14,000 persons in these seven states have been tested—4,000 of whom were assured they had no significant exposure. In the absence of CDC's unique laboratory capacity and diagnostic test, there would have been no way to obtain this personal exposure and health risk information. In addition to the public health benefit, CDC's test provided precise exposure information which averted more than \$50 million in unnecessary home remediation costs. The methyl

parathion emergency just described illustrates the importance of precise measurements of chemicals in people, not simply in the environment. Similar laboratory and epidemiologic capability and response would be needed to respond to an act of terrorism.

Having such measurements means that in any chemical emergency persons truly exposed can be identified, and persons not exposed could be reassured they were not at risk. Emergency response and medical personnel can then focus their limited resources in the most efficient and effective ways possible.

ADDITIONAL STRATEGIES BEING CONSIDERED

In addition to the current capabilities that I have just described, CDC is working with other Federal agencies to define improved systems and technologies for responding to these types of emergencies. Some of the strategies being considered include:

- The development of the laboratory capacity to more rapidly provide critical measurements chemical agents in people.
- The provision of additional training for local health professionals in order to assure that there are an adequate number of highly-trained professionals at state and local levels who know how to address and manage these chemical emergencies, including physicians who know the proper medical treatment for victims.
- The provision of training, laboratory capacity, quality assurance and quality control, along with the development of technology that can be transferred to Regional or State laboratories to aid in the response to chemical emergencies.
- The enhancement of current information and communication systems at the local, state, and Federal levels.

In closing, I would like to reiterate that public health at all levels—local, State, and Federal—is the integrating factor in our response system to all types of health emergencies. One of the most critical components of the public health response to a chemical weapon terrorist attack is the capability of state and local public health agencies. Personnel working at state and local public health institutions will be among the first to respond to any act of terrorism. Whether natural or intentional, health emergencies require an immediate response, capacity to triage victims, medical treatment for those who are ill, follow-up for those who are at risk of disease, and assistance to help communities recover from the crisis.

Thank you for the opportunity to testify today. I will be happy to respond to any questions you may have.

POTENTIAL PROBLEMS

Senator FAIRCLOTH. I do not have a lot of questions, but I have a few.

I want to thank the panel for an informative and somewhat frightening presentation as to what we could be facing and how little we are aware of the potential problem that exists.

Chief Fincher, the two men that were arrested in Las Vegas recently, when they boasted to an informant that they had anthrax—it took 3 days to determine what the substance really was, which seems to me like a long time. Now, I have never examined anything to find out whether it was anthrax or not, but if it really was, 3 days would have given it time to do most anything it was going to do. How long did it take you in the Charlotte incident to determine what the material was?

Mr. FINCHER. After doing the x rays and the questioning of the subject who had the instrument with him, it was determined there were no other agents attached to it other than explosives. So, it was quickly determined.

But listening to his discussion about having anthrax with him—that is the word he used—we got with the South Carolina law enforcement in South Carolina to check his home, and he had petri dishes in there, connections to the Internet system, and actually growing some type of fungus or molds inside of an aquarium. We

never did determine what he had at home, but we know that it was not anthrax. We knew the instrument he had with him was just an explosive device.

Senator FAIRCLOTH. How long did it take to do all this?

Mr. FINCHER. I would have to yield to the experts in that area, sir.

Senator FAIRCLOTH. How long did it take you in Charlotte before you found out?

Mr. FINCHER. 16 hours.

Senator FAIRCLOTH. 16 hours.

Mr. FINCHER. Yes, sir.

Senator FAIRCLOTH. I have been told that Charlotte was 1 of the 12 cities that will be trained through the 120-cities project that the Justice Department is sponsoring. This project apparently provides training for local responders to help prepare for a terrorist attack.

Once you have been trained, where does the money come from for the equipment and manpower to do the job?

Mr. FINCHER. That is a question that we all have, sir. We know that the training is a good first step. It is more of an awareness level training, and the Department of Defense will leave approximately 300,000 dollars' worth of equipment in our community just kind of on permanent loan. But we are going to need specific training on the instrumentation, the protective devices to protect our actual first responders who are exposed.

Senator FAIRCLOTH. So, there is no plan for funding right now to train you, but to provide the money for personnel or equipment beyond what the Department of Defense would leave with you, there is no planning for funding beyond that?

Mr. FINCHER. No, sir; not that I am aware of.

Senator FAIRCLOTH. Dr. Knouss, do you consider epidemics an emergency we need to prepare for?

Dr. KNOUSS. I take it by that question that you are talking about naturally occurring epidemics.

Senator FAIRCLOTH. That is right, yes.

Dr. KNOUSS. OK, because we are also very concerned about trying to plan for an influenza pandemic as well at the same time and many of our colleagues at the Centers for Disease Control are also trying to deal with some of the issues that are common to how to deal with naturally occurring epidemics as well.

But, sir, we are at the present time, and as the President announced 1½ weeks ago at Annapolis, we are going to be making a concerted effort at the present time to begin to be able to strengthen our capability, particularly in the public health infrastructure dealing with some of the research and development activities and trying to enhance some of our response capabilities to deal with the potential for an epidemic that might result from a terrorist attack.

One of the things that I just might point out is that there are some potential biological weapons that do not present the threat of an epidemic in terms of secondary and tertiary spread. What they do present is a very massive initial exposure to an illness. So, for example, with a disease like anthrax, the risk is to those people that are initially exposed, but anthrax is not a disease that will be passed on from person to person.

On the other hand, a disease like bubonic plague, which we were very concerned about when we had the scare from the incident in Ohio and some other threats that have arisen, that disease is highly infectious and can be passed on from person to person.

I think that Dr. Hughes might at some point address this issue of the dual challenges of one where you have an attack that might expose a large number of people in an initial incident as opposed to one in which you really run the risk of secondary and tertiary spread of the disease from person to person as a result of the initial infection of the population.

But, yes, sir, we are concerned about preparing for the possibility of epidemics. They are different in nature. Each one has its own unique characteristics and presents its own unique challenges. We are now, I would say it is safe to say, really in our initial planning stages of how to be able to best prepare the country to be able to deal with that kind of attack.

Senator FAIRCLOTH. You mentioned—I have just enough knowledge to be aware of my ignorance. On the bubonic plague, it was a bacterial disease, was it? Does that still exist? Is there potential to break out somewhere again in the country?

Dr. KNOUSS. With your permission, Senator, one of the pre-eminent infectious disease experts is sitting to my left and I would really like to be able to defer to him to answer those kinds of questions.

Senator FAIRCLOTH. Dr. Knouss, if you are not in politics, you should get into politics. [Laughter.]

You understand how to handle a problem. This whole Senate was designed by Tom Sawyer, you know the story of painting the fence? Pass it on. [Laughter.]

Dr. Hughes, I was just reading on the bubonic plague. I think it wiped out one-third of the people in Europe and many cities. I notice Toulon, Marseilles lost as much as 60 percent and it took 100 years to rebuild the population to what it was when it first struck.

Now, my question is, does bubonic plague still exist today?

Dr. HUGHES. That disease most certainly still exists and the organism exists. In fact, it is present in the United States, and every year in this country we have between 5 and 15 cases.

Senator FAIRCLOTH. Of bubonic plague?

Dr. HUGHES. Of bubonic plague, and they occur in Western States. I might say that over the past 10 years, the geographic extent over which they have occurred has actually increased. So, it is an example of a disease that is emerging in new areas in this country.

Now, globally it is a much bigger problem, and you may recall the epidemics of plague in India in 1994 that caused major—

Senator FAIRCLOTH. I do not recall. Was bubonic plague in India in 1994?

Dr. HUGHES. Yes; there was an outbreak of bubonic plague. Well, just briefly to comment on that because it is important in several ways. There was an outbreak of bubonic plague in a rural area about 150 miles east of Bombay, and then an outbreak of bubonic plague, the type of plague that can be transmitted from person to person, in a city named Surat. It resulted in total economic collapse in the city of Surat, fleeing of the population, including many

health care workers, and had major implications for the United States. It provided another reminder that we live on a global village and there was legitimate concern about the potential for patients with bubonic plague coming from India into the United States because of the volume of travel from India to the United States. So, it highlights how problems in other parts of the world are directly germane to us in this global village in which we live.

It also emphasizes very clearly how absolutely critical surveillance is, epidemiologic response capacity, and laboratory diagnosis capacity. When that outbreak occurred, there was one functional WHO collaborating center in the world that could be called upon to deal with this problem, and that happened to be at our facility in Fort Collins, CO.

Senator FAIRCLOTH. Do we have a global monitoring program? And the changes in Russia—how would that have affected it? And how many people does the Centers for Disease Control have to monitor for plague outbreaks? How many people are looking at potential plague epidemics around the world?

I read something rather interesting. I am sure it is redundant for you. It came out of the chicken flu in Hong Kong that in World War I—I believe they called it spanish flu then—took literally months to move from Kansas where it probably began to Verdun in the front lines of Europe. It was literally months, but today the way the world moves so rapidly, most any disease could be around the world within literally hours.

How many people do we have to monitor such a possibility?

Dr. HUGHES. Well, I guess all CDC employees, sir. These diseases can break out anywhere in the world.

Now, we have our hands full—

Senator FAIRCLOTH. Now, what now? Six?

Dr. HUGHES. The global population.

Senator FAIRCLOTH. No, no, no. How many people does the Centers for Disease Control have to monitor these possible plague epidemics?

Dr. HUGHES. Well, the total number who work at CDC is about 6,500 people. There are about 1,100 in the National Center for Infectious Diseases.

Now, fortunately, of course, we are not in this alone. We work globally to support the efforts of the World Health Organization to strengthen global surveillance around the world, and the influenza situation is a good example of why that is so critical.

That episode in Hong Kong involving the avian influenza strain that had never before infected humans was a very loud wake-up call about the long overdue state that we are in, in terms of the next influenza pandemic.

Senator FAIRCLOTH. Dr. Jackson, some States would like to close their State laboratories and have private laboratories take over. In your judgment would this compromise our protection or improve it? Is keeping a State agency open necessarily good or bad? What would be your opinion as to States closing labs and contracting with private laboratories?

Dr. JACKSON. Senator, you cannot do epidemic investigations without a strong laboratory. Bad data is worse than no data at all.

You are better off not knowing than being given bad information. You have got to have strong labs working with you.

The State labs perform an extremely important function. A lot of the tests they do are not terribly cost effective. If you are only looking at 10 rabies tests a month or you are only looking at a certain chemical like dioxin or solvents in the blood or something like that, they tend not to be cost effective for a commercial laboratory. They tend to be too high tech for a hospital laboratory, and yet this is a public service that State and local laboratories need to provide to the public health protectors in that community.

I think it is very dangerous to back away from the support for public health laboratories either at a State or a local level. We are going to have to be smart about it because not every lab ought to offer every test, but we have got to figure out the best way to deploy limited resources to make sure that we have got the services close to the people that really need it.

Thank you.

Senator FAIRCLOTH. I was interested in the rapid toxic screen project that you have underway. I understand the military is involved in the project as well. Can you tell me why this would be a valuable tool in the event of an epidemic or attack?

Dr. JACKSON. When one of these events occurs, literally thousands of people arrive at the hospital door, and you have got to very quickly figure out who are the people that are going to need immediate care. You will take care of those people right away and you can figure out by looking at them pretty much what kind of treatment they are going to need. There is going to be a whole group of people that you are going to have to figure out what do they really have on board. Are they going to be exposed to a carcinogen? Do they have reproductive or birth defect hazards that they are going to be concerned about, a string of other exposures?

These are not routine tests that any laboratory can run, and you need an ability to take a human specimen, a blood specimen, a urine specimen, and look at that chemical in that person to say how much they have. It is going to be important to the person making a decision at the scene. It is also going to be important to people who are trying to reconstruct this event a bit later on to tell people and communicate here is what you need to worry about.

That episode I was talking about in Sacramento on the Sacramento River, one of the things we had to decide very quickly was to tell women whether to go get a certain kind of blood test for neural tube defects, a birth defect, because this chemical was associated with reproductive hazards. So, knowing who had how much chemical was very, very helpful to the people on scene.

Senator FAIRCLOTH. How many containment labs do we need?

Dr. JACKSON. Containment labs are the biological labs, and I am going to defer to Dr. Hughes on that.

Dr. HUGHES. We need more than we have, sir.

Senator FAIRCLOTH. How many do we have?

Dr. HUGHES. Well, it depends on how one defines a biological lab. Let me give you a specific example to answer that question. When people talk about containment labs or maximum containment labs that came into play in the "Hot Zone" book that you mentioned, those are labs that conduct work at biosafety level 4 where people

have to wear space suits, among other protective equipment. There are two of those in the United States, one at CDC and one at U.S. Army Medical Research Institute of Infectious Disease [USAMRIID] at Fort Detrick in Frederick, MD.

Senator FAIRCLOTH. The one at Fort Sam Houston?

Dr. HUGHES. No, no. Fort Detrick in Frederick, MD.

Senator FAIRCLOTH. OK, I am sorry.

Dr. HUGHES. We refer to it as USAMRIID facility there. But there are two in the United States.

There is one in South Africa. There is one in Russia, at least one. There is one being built in Canada. There is one being built in France. But the global capacity to work with those types of agents is very limited.

Beyond those agents, though, there are many other organisms that need to be worked at at relatively high levels of biocontainment, and we and others are constrained for that space as well.

Senator FAIRCLOTH. Dr. KNOUSS, I am going to ask this question and we will wind it up. When can we expect vaccines and antibiotics to be in the hands of the people in the field like Chief Fincher?

Dr. KNOUSS. We are trying now to decide what are the most important things to have in a stockpile, particularly for dealing with biological terrorist attack, how large that stockpile should be, how it should be positioned. When we began working with the cities to create metropolitan medical strike teams, we developed—

Senator FAIRCLOTH. What are you doing now?

Dr. KNOUSS. It is the systems that are the local response capability that we have been training in the 27 largest cities, and hopefully in the not too distant future, we will be getting to Charlotte as well.

We created a list of pharmaceutical supplies that most of the cities have purchased using some of the funds that we have provided to them.

What that does not cover is the potential for biological attack. Now we are at the point where we are trying to determine how large a stockpile ought to be, how it ought to be able to be distributed, how much needs to be prepositioned at the local level as opposed to at a national level because for any one of these events, the difficulty in planning for them and the difficulty in the cost associated with it is that these are relatively low probability but very high impact events. In other words, there is a low probability that any single community might be affected by one of these events, but if it is, it will have a very serious impact if we are not able to prevent it.

So, the question then for us becomes how best to be able to invest in what kinds of antibiotics and vaccines, how to preposition them, how to be able to distribute them rapidly after a determination has been made that there is a significant exposed population.

For two issues we still have a lot of work to do in terms of being able to develop good vaccines.

The current vaccine supplies for smallpox are becoming less potent because they are held over from our smallpox eradication days and the decision has to be made as to how we are going to adequately vaccinate a population if it still should be exposed to the

use of smallpox or release of smallpox, if that should ever occur again in the population.

And the second is on the anthrax vaccine, all the total production is being used by the military. Therefore, we are really at a position now where we have to start thinking about whether or not a second generation of anthrax vaccine that would require fewer doses than the current vaccine should be developed, how much supply we are going to need and where it ought to be prepositioned.

So, all of those are very serious questions that we still have in our minds. A lot of discussions are taking place at the present time. I think probably in the not too distant future, the administration will be in a position to be able to come forth with some proposals in that regard.

Senator FAIRCLOTH. Dr. KNOUSS, the Government has absolutely the best planners and thinkers. If something happened today, we have nothing, do we? Is that what you are saying?

Dr. KNOUSS. No; I am saying it a little bit differently than that, Senator.

Senator FAIRCLOTH. Do we have anything this afternoon?

Dr. KNOUSS. There are some things that we are ready for, but there is a lot of—

Senator FAIRCLOTH. Anthrax.

Dr. KNOUSS. Well, there is some anthrax vaccine that is available and we have a lot of anthrax antibiotics. But we do not have an adequate system in order at the present time, if we had a very large exposed population, to be able to deal with that problem, and that is what is of concern to us. It is going to be some time—

Senator FAIRCLOTH. Why not? How long have we been planning on this? How long have we known that potential terrorist attacks were out there? We do not have a system. We must have known it for a long time. If we do not know now, when will we find out?

Dr. KNOUSS. There are two aspects of that, Senator. One is that I think everyone's sensitivity has been heightened.

Senator FAIRCLOTH. Has what?

Dr. KNOUSS. Has been heightened. Our sensitivity to the potential problem has been heightened.

Senator FAIRCLOTH. How long has it been heightened? It has been how long since the Oklahoma bombing, how long since we have been reading about the terrorist potential for antiterrorist viruses and whatever from the Persian Gulf conflict?

I sit here as a citizen and it sounded like we are no farther along than we were, say, 5 years ago. We are still studying. We are still planning. We are giving it thought. We are thinking about it, but if something happened today on a situation that has been developing in this country for years, 5, 6 years, it would sound to me from what you are saying that we would be pitifully prepared. Is that not true or are we ready to go this afternoon?

Dr. KNOUSS. We are at neither of those extremes.

Senator FAIRCLOTH. We are what?

Dr. KNOUSS. We are at neither of those extremes. We are making progress but we have a long way to go. That really sums up the position that we are in at the present time. We have taken a lot of steps over the last several years. Let me just say from the time that we were at Oklahoma City and experienced what happened at

Oklahoma City, we made an enormous progress in prepositioning assets for the Olympics that took place in Atlanta, Georgia and were able to respond in Centennial Olympic Park when that bombing took place.

We have now been training teams in some cities around the country. We have some additional capability of being able to respond to a chemical attack.

Senator FAIRCLOTH. To what?

Dr. KNOUSS. To a chemical attack.

Senator FAIRCLOTH. Well, I don't understand we're speaking of the American people. The millions and hundreds of millions and billions of dollars that have been poured into these kind of programs, and I would like to hear that it was further developed than it is, but if it is not.

Dr. Hughes, I am having trouble understanding. Did you tell me we had thousands of people monitoring on the plague epidemics around the world? Will you tell me exactly how many we have working on worldwide plagues?

Dr. HUGHES. Oh, on plague, OK. Let me be very specific about that. We most certainly do not have thousands.

Senator FAIRCLOTH. How many people?

Dr. HUGHES. In 1994 when—

Senator FAIRCLOTH. I mean in 1998—now.

Dr. HUGHES. May I have 30 seconds to tell it? Because I think you will see that plague is an area where we have made a little progress because of the wake-up call in India. I mentioned there was one WHO collaborating center, laboratory in the world in 1994. It was staffed by one person. One person.

Senator FAIRCLOTH. We had one laboratory with one person.

Dr. HUGHES. Right.

Senator FAIRCLOTH. Did they feel like it was overstaffed? [Laughter.]

Dr. HUGHES. We are not sure who that person talked to. [Laughter.]

Clearly not overstaffed; clearly understaffed. But yet we were the last line of defense for the world really in helping the Indian Government—

Senator FAIRCLOTH. Even that one person—

Dr. HUGHES. We obviously mobilized a few other people who knew something about plague and we sent four people to India to work. Now, today—

Senator FAIRCLOTH. We are not really taking it seriously if we have one lab with one person.

Dr. HUGHES. The only reason we had one was because of those few cases that occur in the United States each year that I mentioned to you.

Today we have probably five or six. I would have to check for the record to be precise, but we have approximately six people working on plague. But that plague laboratory has been rejuvenated as part of this incremental implementation of the CDC plan. So, we are in better shape with plague than we would be with anthrax, say, where we have nobody basically working on anthrax.

Senator FAIRCLOTH. Gentlemen, thank you so much. To each of you, I thank you. It is something that the American people are

more concerned about than you might expect. It is something we hear about. I realize you are under constraints to be able to expand and hire. Thank you.

Gentlemen, thank you and we will continue to discuss the country's preparedness or lack thereof for epidemics and bioterrorism.

PREPARED STATEMENT OF DR. DAVID L. HEYMANN, ON BEHALF OF THE
WORLD HEALTH ORGANIZATION

We have received a prepared statement from Dr. David L. Heymann, on behalf of the World Health Organization, his statement will be inserted into the record at this point.

[The statement follows:]

PREPARED STATEMENT OF DR. DAVID L. HEYMANN

THE NEED FOR GLOBAL SURVEILLANCE AND MONITORING FOR INFECTIOUS DISEASES

The challenge

Infectious diseases remain a global problem in the late twentieth century. Global surveillance is an urgent necessity to protect the health of people throughout the world. There is reason to believe that the emergence of previously unknown diseases and the re-emergence of old ones is increasing. One-third of the 52 million deaths in the world in 1995 were due to infectious diseases, and this ratio remained the same in 1996 and 1997. Infectious diseases spread when adequate financial and human resources are not devoted to infectious disease control and when microbes in animals find suitable conditions to jump the species barrier and infect humans. Factors responsible for the increase in infectious diseases include social changes such as mass population movements, rural-to-urban migrations and accelerated urbanization, population growth, rapid transport, global trade, new food technologies, and new life styles as well as environmental changes such as altered land use patterns and irrigation that increase the risk of human exposure to animal reservoirs and vector-borne infections. A new outbreak may first appear in a circumscribed area, but with expanding global travel and trade, the disease can span entire continents within days or weeks as influenza periodically demonstrates. The diseases that have crossed, or threaten to cross, international borders menace international public health security. Today these infectious disease outbreaks and epidemics are not only costly to the economies of the countries in which they occur, but are also a concern for all countries because no country is safe from infectious disease.

For example, during 1997:

- Major cholera epidemics spread throughout eastern Africa, affecting hundreds of thousands of people in more than ten countries over several months; trade sanctions were unnecessarily placed on fish exports from these countries resulting in severe economic impact on their fragile economies;
- Yellow fever fatalities were reported in seven countries in Africa and South America;
- Meningitis caused major epidemics in Africa, with over 70,000 deaths reported in the 1996–1997 season;
- More than 15,000 cases of typhoid fever with resistance to first line antibiotics occurred in Tadjikistan;
- Epidemic typhus resurged in Burundi with over 30,000 cases and untold deaths;
- An avian influenza virus emerged in humans in Hong Kong, killing six out of eighteen people, and was carefully monitored for its potential to be the next pandemic influenza threat;
- Rift Valley Fever afflicted thousands of people, killing hundreds and many of their livestock in Kenya and Somalia;
- The prevalence of hepatitis C continues to increase in countries where blood is not screened prior to use and where sterilization of medical equipment is faulty;
- Lassa fever, with high mortality, re-emerged in Sierra Leone;
- An outbreak of dengue fever occurred in Cuba for the first time since the 1981 epidemic;
- The investigation of an unexpectedly large human monkeypox outbreak in Africa raised new issues about this important disease and the safety of smallpox vaccination in the era of AIDS;

- The number of cases of new variant Creutzfeldt-Jakob Disease reached twenty-four in the United Kingdom and France combined with the continuing threat of bovine spongiform Encephalopathy (BSE or mad cow disease), and the United Kingdom's economic loss from BSE was estimated to have reached 5.7 billion U.S. dollars;
- Escherichia coli* 0157 continued to surface in industrialized countries including Japan and the United States; and
- Vancomycin-resistant *Staphylococcus aureus* was identified in Japan for the first time, and later in the United States.

The solution

The concern of industrialized countries such as the United States, where prevention and control efforts have dramatically decreased infectious disease mortality, is international public health security: ensuring that infectious diseases which are occurring elsewhere do not spread internationally across their borders.

The concern of developing countries is to detect and stop infectious diseases early, thus avoiding high mortality and negative impacts on tourism and trade. Yet, developing countries are constrained by the lack of appropriate technologies and the difficulty of financing the necessary interventions on a sustainable basis.

The solution, which addresses the interests of both the industrialized and developing countries, is to combine their efforts to strengthen detection and control of infectious disease. The major requirements for the prevention and control of infectious diseases globally and nationally are:

- Strong global and national epidemiological surveillance and public health laboratories to detect infectious diseases, to provide data for analyzing and prioritizing health services, and to monitor and evaluate the impact of control efforts plus global monitoring and alert systems to bring together laboratories and disease surveillance systems from all countries to share information internationally through electronic and printed media.
- Sustainable and well-managed infectious disease control programs which effectively diagnose infectious diseases and administer vaccines, curative drugs, and other interventions where and when they are needed.
- Continuing research and development of simple-to-use and robust vaccines, antimicrobial drugs, and laboratory tests for effective surveillance, prevention, and control of infectious diseases.

WHO's global strategy and collaboration with CDC

To combat the spread of infectious disease a global framework is needed to build up the necessary networks for surveillance and control of infectious diseases. The World Health Organization works to build such a global framework and effective networks through its Division of Emerging and other Communicable Disease Surveillance and Control (EMC).

WHO has responded to the threats of infectious disease by developing a four-part strategy for international surveillance. First, WHO has instituted a global monitoring and alert system for communicable diseases that brings together laboratories and disease surveillance systems from all countries to share information internationally through electronic and printed media. Revision of the International Health Regulations (IHR) is underway and will be proposed for adoption by the World Health Assembly in 1999. The new International Health Regulations will require Member States to report a spectrum of communicable disease syndromes of international public health importance in addition to the three specific diseases covered at present. These proposed new regulations are now being field-tested. Second, WHO rapidly and widely disseminates global information collected from national Ministries of Health, WHO Collaborating Centers, and governments via electronic means and the WHO World Wide Web site. EMC also has an electronic alert system designed to help facilitate expert verification of unconfirmed outbreak information on a confidential basis. Third, WHO helps in establishing national and regional preparedness for communicable disease prevention and control. EMC provides manuals, standards, and guidance to national centers. The weak link in current global monitoring capacity is the collection of clinical/epidemiological data. At present, few countries have an adequate national infectious disease monitoring system, and most are extremely weak. Some of the most important geographical regions in terms of disease emergence, are the weakest, and this situation needs to change. Finally, WHO encourages international preparedness for communicable disease prevention and control, which supports and augments national and regional preparedness while national systems improve their capabilities.

The key to global surveillance and control of infectious diseases has been a collaborative effort between WHO and its partners, including national-level agencies

like the Centers for Disease Control and Prevention (CDC), which play a critical role in continuing domestic surveillance and control which minimizes the risk of international transmission of infectious diseases.

WHO's goal is to strengthen national preparedness in all countries, which will require a substantial long-term commitment of human and material resources by many partners to strengthen the infrastructure and processes for disease control and surveillance in poorer countries. WHO's role has been to reinforce global laboratory-based surveillance by providing training and support to existing WHO Collaborating Centers and laboratories. WHO gives seed funding for development and distribution of diagnostic reagents and designates new centers and laboratories to fill geographic gaps. CDC already provides valuable assistance in quality assurance to WHO supported laboratories monitoring bacterial, viral, parasitic and zoonotic diseases throughout the world. CDC also provides expert training in epidemiology and other areas of public health, working with WHO and other international partners.

WHO has improved global epidemiological surveillance and facilitated rapid reporting of and response to infectious disease of international public health importance. Surveillance has specifically focused on developing a system to detect and investigate unusual infectious disease outbreaks, whether naturally occurring or intentionally caused. WHO has been working with the monitoring group of the Biological Weapons Convention (BWC) to make sure that all diseases of concern to BWC are included in these surveillance guidelines. WHO Member States and WHO's network of regional offices, country representatives, and technical partners such as CDC are now being linked electronically for verification and response. The response mechanism permits rapid and coordinated international investigation and containment of infectious disease outbreaks of international importance. WHO-coordinated international response broadens international cooperation so that no country is required to shoulder the entire burden of responding to an infectious disease outbreak of international importance. Without such a coordinated international response, many disease outbreaks could have resulted in extensive international spread.

EMC is strengthening global surveillance through adding new collaborating partners to the network of WHO Collaborating Centers in infectious disease and/or the anti-microbial resistance (ARM) monitoring network. WHO is working to incorporate military laboratories which often have good capabilities even in poorer countries, together with WHO Collaborating Centers into the global monitoring system for diseases and antimicrobial resistance.

Increased support to CDC for international collaboration with WHO would permit more rapid strengthening of surveillance and control capabilities worldwide, especially in poor countries. By permitting rapid detection and containment of infectious diseases when and wherever they occur, the risk of their entering the United States of America is minimized. Together, WHO and CDC will be working to advance all of the elements of current efforts to strengthen the global monitoring system to ensure international public health security.

STATEMENT OF MICHAEL OSTERHOLM, Ph.D., CHAIR, COMMITTEE ON PUBLIC HEALTH, PUBLIC AND SCIENTIFIC AFFAIRS BOARD, AMERICAN SOCIETY FOR MICROBIOLOGY

Senator FAIRCLOTH. I would like to welcome the second panel of experts and I would like to take a moment, if you would, to limit your opening statement to 5 minutes, but do not feel you should rush. We asked you to come and if you are not through, why, we will cut the light off and you can finish.

The three panelists are Dr. Michael Osterholm. Is that right, Doctor?

Dr. OSTERHOLM. That is right.

Senator FAIRCLOTH. He will be representing the American Society for Microbiology. He is chair of the Committee on Public Health and serves on the public and scientific affairs board, the task force on biological weapons, and the task force on antibiotic resistance. He is a professor at the School of Public Health at the University of Minnesota and serves on the editorial board of a number of prestigious medical journals, including the New England Journal of Medicine and Science magazine. Thank you for being here.

The second witness on this panel will be Dr. Edward Thompson. Dr. Thompson is a physician and has a masters of public health degree from Johns Hopkins University. He has served as Mississippi health officer since 1993 and will represent the views of the State public health professionals today. Thank you, Dr. Thompson.

Our third witness will be Dr. Ralph D. Morris, president of the National Association of County and City Health Officials. This group represents nearly 3,000 local public health departments. He is a medical doctor and director of the Galveston County Health Department in Texas. I assume Galveston is in Galveston County.

Dr. MORRIS. That is correct, sir.

Senator FAIRCLOTH. Does it go beyond the island?

Dr. MORRIS. Well, we consider anybody north of the causeway a Yankee, sir. [Laughter.]

Senator FAIRCLOTH. Dr. Osterholm, we will begin with your testimony please.

Dr. OSTERHOLM. Thank you. Senator Faircloth, we would like to thank you on behalf of the American Society for Microbiology to be able to be here with you today to testify on issues related to public health needs and the threat of bioterrorism. The ASM has submitted a written statement for the hearing record, which I will briefly summarize.

The high consequence implications for bioterrorism puts it into a special category that requires immediate and comprehensive response. However, the ASM believes that enhancing the public health infrastructure response to bioterrorism will also increase our ability to respond to naturally occurring and reemerging infectious diseases that now seriously threaten the health and security of the United States.

Biologic weapons for the use against civilian populations differ in important respects from other weapons of mass destruction and require a very different approach for the deterrence, detection, and response. Understanding these differences is critical.

A key difference is that most biological weapons cause diseases that exist in nature. This is even true for the fictional examples of genetically engineered biological weapons since the symptoms they cause may not differ significantly from the infectious diseases that are found in nature. The investigative steps for detecting and identifying a biologic agent released into a civilian population will be the same as that for a naturally occurring agent. Therefore, the first and most fundamental defense strategy for dealing with bioterrorism is to develop effective means for combating infectious diseases and improving our public health infrastructure and biomedical research capacity.

However, experts have concluded that the ability of the U.S. public health system and allied health professionals to deal with emerging diseases is in serious jeopardy today. Even with the recent infusion of Federal support for the emerging infections program, the overall infrastructure for infectious disease surveillance at the Federal, State, and local levels has seriously suffered. Gaps in surveillance have a direct impact on our overall ability to respond to threats or acts of bioterrorism.

Such deficiencies are a very critical, weak link in our Nation's defense against biological weapons. Unlike nuclear convention

bombs or even chemical weapons, a biological weapon is unlikely to cause instant harm. Because symptoms take days to develop, an act of bioterrorism may go undetected for days or even weeks after it occurs. For some of the diseases, many secondary cases could occur among contacts of ill persons and would also be randomly distributed. Delay in detecting these cases by hours could mean the difference between an order of magnitude in the increased number of serious illnesses and deaths.

Successful detection of a secret bioterrorist attack depends on many members of the health care and public health system promptly recognizing an unusual infectious disease pattern. This will require a concerted effort of clinicians, specialized personnel to confirm the diagnosis of the suspected disease agent, public health experts to determine multiple causes have occurred simultaneously but unexpectedly, and finally additional experts to conclude that the cases of disease in question were not acquired naturally but through a deliberate act of bioterrorism.

All of the recent efforts surrounding the use of the National Guard, Department of Defense, and local hazmat teams will do nothing—I repeat, will do nothing—to assist us in the recognition and even in many cases our response to biological terrorism.

State health departments and CDC resources and expertise are vital for detecting bioterrorist actions in the same way that its expertise has helped in identifying the biological agents responsible for unusual, naturally occurring disease outbreaks. However, currently neither the CDC nor the State health departments have the capacity to respond to threatened bioterrorism actions involving potential weapons such as anthrax, plague, tularemia, or smallpox.

One major concern is that the CDC does not have adequate and safe space for working with these relatively rare but dangerous etiologic agents. State health departments also do not have the expertise or facilities for working with exotic agents. Additional funding, not reallocated funding, but new funding for laboratory facilities, equipment, and research is urgently needed.

Ensuring the adequacy of vaccines and the antimicrobial drugs will be critical for minimizing casualties with an attack with biological weapons. Federal agencies should investigate the needs and accessibility for vaccines and antibiotics that may be necessary in the event of a bioterrorism attack and they should work with pharmaceutical industries to ensure that emergency supplies can be produced and made available on short notice.

The ASM, therefore, makes the following specific recommendations to increase U.S. preparedness.

First, an investment of approximately \$200 million could provide an essential first step toward enhancing efforts to address bioweapons threats.

Second, the CDC plan to combat new and reemerging infectious diseases should be funded at a proposed level of \$125 million in fiscal year 1999.

An additional \$50 million is needed to complete phase II of the new laboratory facility at CDC that will be used for working with particularly dangerous microbiological pathogens, including those that might be used for bioterrorism purposes.

The ASM believes it is imperative that CDC be given specific resources at a minimum of \$1 million to implement the congressionally mandated program to monitor the transfer of select infectious agents.

Congress mandated CDC to implement and enforce regulations for monitoring the transfer and exchange of biologic agents within the United States under the authority of the Anti-terrorism and Effective Death Penalty Act of 1996. However, section 511 of that act, regulatory control of biologic agents, was intended to protect public safety while allowing free and open scientific research. Regulations implemented by the Department of Health and Human Services are not currently fulfilling that mandate. The registration program for laboratories transferring and receiving specified infectious agents must be funded by Congress to prevent interference with very valuable and critical scientific research.

PREPARED STATEMENT

In closing, the ASM believes that improving the U.S. bioterrorism response capabilities will provide broader benefits to public health overall. Efforts to improve disease surveillance, biomedical research, and development of improved diagnostics, therapeutic agents, and vaccines serve the dual purpose of protecting the public health and defending against biologic weapons. None of the additional capacity implemented to counter the threat of bioterrorism will be inactive or wasted.

Thank you for the opportunity to testify. I would be pleased to respond to your questions at the appropriate time.

Senator FAIRCLOTH. Thank you, Doctor.

[The statement follows:]

PREPARED STATEMENT OF MICHAEL OSTERHOLM

Mr. Chairman, Senator Faircloth, members of the Subcommittee, thank you for inviting the American Society for Microbiology (ASM) here today to discuss issues related to the public health infrastructure, epidemics, and bioterrorism. I am chair of the Public Health Committee of the American Society for Microbiology's Public and Scientific Affairs Board and my testimony today is presented on behalf of the ASM. For the record, I am the State Epidemiologist and Chief of the Acute Disease Epidemiology Section of the Minnesota Department of Health.

The ASM is pleased to have this opportunity to serve as a resource to the Subcommittee and offers to make its full professional capabilities available, particularly as you consider some of the special public health needs that stem from threats of bioterrorism. We would like to thank Chairman Specter, Senator Faircloth, and other Senators on the Subcommittee for convening this hearing and also for their past and continued strong support for the infectious disease programs of the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH), both of which are critical components of an overall national defense against infectious diseases and bioterrorism. We particularly thank Senator Faircloth for initiating this hearing.

The ASM is the largest single life science society in the world, with over 42,000 members, representing a broad spectrum of subdisciplines in the microbiological sciences, including medical, environmental, and public health microbiology as well as infectious diseases. The Society's mission is to promote a better understanding of basic life processes and the application of this knowledge for improved health and environmental well being. For nearly a century, ASM has brought its scientific, educational, and technical expertise to bear on issues surrounding the safe and appropriate study, handling, and exchange of pathogenic microorganisms. On numerous occasions, members of the Society have provided advice to government agencies and to Congress concerning both technical and policy issues related to the control of biological weapons. The ASM has established a Task Force on Biological Weapons Defense to assist in formulating policy on scientific issues.

INFECTIOUS DISEASES AS A PUBLIC HEALTH THREAT

The threat of bioterrorism needs to be considered in the broader context of the public health threat posed by infectious diseases. Although biological weapons pose a new and credible potential threat, naturally occurring infectious diseases caused by emerging and reemerging pathogens seriously threaten the health and security of the United States on an existing and continuing basis. The high consequence implications for bioterrorism put it into a special category that requires immediate and comprehensive response. However, the ASM believes that building the public health infrastructure to respond to bioterrorism will also increase our ability to respond to the naturally occurring and reemerging infectious diseases which seriously threaten the health and security of the United States. In 1996, for example, infectious diseases ranked as the third leading cause of death in the United States. Moreover, since 1980, the death rate in this country from infectious diseases has increased almost 60 percent. During this same period, more than 30 infectious agents have been discovered—most of them dangerous, and some of them deadly.

Infectious agents, old and new, pose challenges of immense complexity to the researchers studying them as well as to the physicians and other healthcare providers who are helping patients combat them. Many factors help to account for why the traditional patterns of infectious disease have been changing, including shifts in human demographics, improper uses of antibiotics, changes in climate patterns, changes in host-parasite interactions and microbial evolution. Meanwhile, enormously expanded world travel and unprecedented international trade provide an efficient means for transporting agents that cause infectious diseases from one part of the world to another, making it possible for a dangerous pathogen to move from a remote village virtually anywhere in the world to an industrialized U.S. urban center very quickly, typically in less than 24 hours.

Infectious diseases may be introduced into an unsuspecting U.S. population not only from natural human, animal, or plant sources but also deliberately as part of a "bioterrorism" scheme—that is, as part of a release of pathogens intended to harm humans directly or to damage the animals or plants on which we depend. Although casualties may be limited if unsophisticated groups deploy biological weapons, the threat of mass deaths from a biological weapons attack is of grave concern.

The ASM recognizes that there is serious public concern about pathogenic microorganisms being used as weapons by nations or individuals. As these concerns are addressed, we recommend a thorough review of general strategies and specific measures needed to protect the public. With this in mind, the ASM offers the following observations and recommendations.

UNIQUE ASPECTS OF BIOLOGICAL WEAPONS

Biological weapons differ in several important respects from other weapons of mass destruction and thus require a different approach for deterrence, detection, and response. Understanding these differences is critical to formulating public policy.

A key difference is that most biological weapons cause diseases that exist in nature and may occur spontaneously in human populations. This is even true for fictional examples of genetically engineered biological weapons, since the symptoms they cause may not differ significantly from the infectious diseases that are found in nature. The investigative steps for detection and identification of the agent would be the same as that for a naturally occurring agent. Therefore, the first and most fundamental defense strategy for dealing with bioterrorism is to develop effective means for combating all infectious diseases. Fears about state sponsored or individual terrorists intentionally spreading agents of infectious disease should not distract us from the underlying war against naturally occurring diseases, including emerging infections that threaten to spread as new epidemic waves causing illness and death.

Improving the public health infrastructure and biomedical research capacity is the most effective approach for addressing both familiar and new or emerging infectious diseases. However, several expert committees, including one convened by the Institute of Medicine, have concluded that the ability of the U.S. public health system and allied health professionals to deal with emerging diseases is in serious jeopardy. For example, a 1992 survey by the Council of State and Territorial Epidemiologists indicates that the number of professional positions dedicated to infectious disease surveillance in most states has fallen below a vital threshold, making infectious disease surveillance efforts inadequate throughout much of the United States. Even with the recent infusion of federal support for the emerging infections program, the overall infrastructure for infectious disease surveillance at the state and local level has suffered. In part this has been due to the substantial reductions in support for

surveillance of vaccine-preventable diseases, HIV infection and tuberculosis. Frequently, state and local health departments will share infrastructure support with other disease programs. In many states no one is tracking foodborne and waterborne diseases any longer. Such gaps in surveillance have a direct impact on our overall ability to respond to threats or acts of bioterrorism.

Such deficiencies count for a great deal because, unlike nuclear or conventional bombs or even chemical weapons, a biological weapon is unlikely to cause instant harm. Thus, because symptoms take time to develop, an act of bioterrorism may go undetected for days or even weeks after it occurs. For example, if a biological agent were secretly released in a busy metropolitan travel center, such as Washington's Ronald Reagan National Airport, cases affecting travelers might not begin to appear until 2 to 14 days later and, by then, among individuals in scattered locations throughout the United States and other parts of the world. If the disease were even moderately contagious, secondary cases would occur among contacts of ill persons and would also be randomly distributed. Delay in detecting these cases by hours could mean the difference between an order of magnitude in the increased number of serious illnesses and deaths. In particular, for such agents as anthrax, plague and even smallpox, a delay of hours in responding to these potential disease problems will result in many more cases and deaths.

Thus, initial detection of a bioterrorist attack could be difficult and the response to it would certainly entail a much more complex strategy than is typically required following an incident involving explosives or chemical weapons. Current systems for counteracting bioterrorist attacks are erroneously being built on models for incidents involving chemical agents, such as the release in 1995 by members of the Aum Shinrikyo of sarin gas in Tokyo. In this and other cases like it, the impact of the attack is immediate, localized, and the affected area and victims are readily identified. Hence, medical management and decontamination efforts can be directed quickly to specific sites. Moreover, first responders and military strike teams can be trained to anticipate such events in a useful fashion, thereby giving some assurance that damages may be minimized, if not altogether avoided.

In the case of a clandestine biological attack, however, sick individuals will not likely be met first by specially trained first response teams. Instead, these infected individuals will seek medical attention in a variety of civilian settings, including emergency rooms, doctors offices, or clinics at scattered locations. Successful detection of a secret bioterrorist attack thus depends on many members of the health care and public health system promptly recognizing an unusual infectious disease pattern. This will require the concerted efforts of clinicians, specialized laboratory personnel to confirm the diagnoses of the suspected disease agent, public health experts to determine that multiple cases have occurred simultaneously but unexpectedly, and, finally, additional experts to conclude that the cases of disease in question were not acquired naturally but through a deliberate act of bioterrorism.

UNIQUE ROLE OF THE CENTERS FOR DISEASE CONTROL AND PREVENTION

To respond to such threats, a multiagency partnership involving federal, state, and local authorities is essential. The ASM believes that the Centers for Disease Control and Prevention is an indispensable civilian component of this partnership. In particular, its resources and expertise are vital for detecting bioterrorist actions aimed at the general population, much in the same way that its expertise has helped in identifying the biological agents responsible for unusual, naturally occurring disease outbreaks. Therefore, it is important to enhance existing public health systems for detecting unusual disease events, the capacity to investigate and control potential threats, and the laboratory capabilities to identify and diagnose suspected agents.

In combating bioterrorism or in responding to natural infectious disease outbreaks, the public is best protected when health care professionals and diagnostic laboratories work together with state and local health departments as well as with the CDC to ensure that unusual outbreaks of diseases are detected and identified early and that appropriate epidemiological and treatment responses are rapidly initiated. For example, during the outbreaks of Legionnaires' disease in 1976 and of hantavirus pulmonary syndrome in 1993, alert physicians notified their respective state health departments and the CDC of unusual cases of illness. In these separate incidents, similarities among the many case reports were noted by state officials and CDC experts working in partnership. They conducted follow-up investigations to identify the cause of the diseases, the sources of infections, and appropriate prevention strategies to implement. Despite these outstanding examples of public health response, the existing surveillance systems in place still required that days occur

between the initial recognition of sporadic cases and the recognition of an outbreak by state and federal authorities.

Although the partnership between CDC and state health departments has been established for decades, the system for communication and cooperation is far from perfect and badly needs modernizing and other improvements that will help to automate the system and make best use of new electronic means for assembling and analyzing data. Rapid channels of communication and information systems must be linked to allow for examination of multiple data sources to detect unusual patterns or early warnings of disease.

TRACKING OF POTENTIALLY DANGEROUS BIOLOGICAL AGENTS

Among specific responsibilities, Congress mandated CDC to implement and enforce regulations for monitoring the transfer and exchange of biological agents within the United States, under authority of the Antiterrorism and Effective Death Penalty (AEDP) Act of 1996. However, although section 511 of that Act, "Regulatory Control of Biological Agents," was intended to protect public safety while allowing free and open scientific research, regulations implemented by the Department of Health and Human Services (HHS) are not fulfilling that mandate. In particular, a registration program and fee schedule for institutions and laboratories transferring and receiving specified infectious agents are interfering with valuable scientific research without providing the public a safety benefit.

The ASM has recommended that CDC be given specific resources of at a minimum \$1 million to implement the congressional mandate under section 511 of the AEDP Act of 1996 without imposing undue restrictions on scientific research. Additional funding would also enable CDC to provide specific new educational and training programs to ensure research institutions are in full compliance with that Act, which is intended to restrict the availability of potential biological warfare agents without hindering legitimate research. U.S. officials, including experts at CDC, should also be involved in monitoring exchanges at the international level of infective agents that could pose a threat to the United States. The ASM recognizes that the major mission of the CDC is not regulating, but to detect, diagnose, prevent and control infectious diseases.

ENHANCING THE CAPACITY TO RESPOND TO THREATS

When bioterrorism activities are suspected, state and federal response teams largely made up of public health and medical delivery infrastructure, must respond quickly to minimize the impact and exposure to whatever infectious agents that have been deployed. Recently described efforts by teams from the Department of Defense and local or national guardians will likely play a minor meaningful role in this response. The incubation period before symptoms appear varies for different infectious diseases and also depends on other factors, including dose and means of exposure. In most instances, response teams can expect at least a small window of opportunity during which exposed individuals may be treated to prevent illness from developing.

However, to take advantage of such opportunities, public health officials and other members of such response teams must be able to identify and then quickly diagnose those individuals who were likely exposed to the infectious agent, so that they can be appropriately treated and quarantined as necessary. The ability to respond quickly and effectively to such incidents depends absolutely on having well-balanced, appropriately trained teams at the ready. Such teams require highly skilled individuals from several disciplines, including those with clinical, laboratory, microbiological and epidemiological expertise.

Currently, neither the CDC nor state health departments have the capacity to respond fully to threatened bioterrorist actions involving potential biowarfare agents, including those that cause anthrax, plague, tularemia, and brucellosis. One major concern is that the CDC has little capacity for working with these diseases and does not have adequate and safe laboratory space for working with these relatively rare but dangerous etiologic agents. State health departments also do not have the expertise or facilities for working with exotic biological agents. Moreover, few laboratories are prepared to conduct the analytical tests needed to identify such agents.

RECOMMENDATIONS FOR ACTION

Hence, additional funding for laboratory facilities and equipment is urgently needed. Research is also needed to develop diagnostic tests that are simple, rapid, inexpensive, and capable of being conducted locally. Most laboratory tests for targeted biological agents take special expertise and considerable time to confirm. Improved

diagnostic methods with faster turn-around times need to be developed and made widely available. For instance, to improve nationwide surveillance efforts, state health departments will need access to diagnostic methods that enable them to compare the molecular "fingerprints" of locally isolated infectious agents to those that appear in a national electronic database. CDC does not have established agreements with the Department of Defense to access rapid testing technology. In addition, appropriately trained epidemiologists are needed at the federal and state level to investigate disease outbreaks and to serve as part of surveillance system teams.

Another major concern is that many of the microorganisms that might be used as biowarfare agents are not causing major public health or veterinary health challenges in the United States. Hence, there is little if any capacity nationwide to deal with large outbreaks of these diseases. Moreover, few physicians or veterinarians have had to deal with actual cases of these diseases, making it unlikely for them to suspect isolated cases caused by such relatively rare and unfamiliar illnesses. To close such gaps, specific training is urgently needed for physicians, other health care personnel, and veterinarians. Professional societies with expertise in these areas will play an important role in providing such training.

The ASM would like to draw attention to the Institute of Medicine's interim report, "Improving Civilian Response to Chemical or Biological Terrorist Incidents." This report contains many useful recommendations for Congress and the Administration to examine. Importantly, the first recommendation in the IOM report is "to provide federal financial support for improvements to state and local surveillance infrastructure," including expansion of the CDC Emerging Infections Initiatives. The IOM report also recommends that professional societies be enlisted in the effort to educate first responders, emergency departments, and poison control centers by incorporating useful information on biological and chemical warfare agents into texts, manuals, and reference libraries. Professional societies, including ASM, could assist in such efforts.

In closing, ASM recognizes that preparedness to protect U.S. citizens against the threat of bioterrorism will require additional federal resources. The ASM, therefore, makes the following specific recommendations:

- The ASM estimates that an investment of approximately \$200 million could provide an essential first step toward enhancing efforts to address bioweapons threats.
- The ASM further recommends that Congress fully fund the CDC plan to combat new and reemerging diseases at a proposed level of \$125 million in fiscal year 1999.
- An additional \$50 million is needed to complete phase II of the new laboratory facility at CDC that will be used for working with particularly dangerous microbiological pathogens, including those that might be used for bioterrorist purposes.
- The ASM recommends that CDC be given specific resources at a minimum of \$1 million to implement the congressionally mandated program to monitor the transfer of select infectious agents.

As we mobilize these resources, we must ensure that we also maintain or strengthen our essential public health efforts. Diverting resources needed for vaccines that protect the public against deadly natural diseases such as polio and diphtheria would be wrong. Thus, even as we prudently build our capacity for countering the genuine threat of bioterrorism, we must not overreact to that threat by ignoring our vulnerability to naturally occurring infectious diseases.

The ASM believes that improving U.S. bioterrorism response capabilities will provide broader benefits to public health. Efforts to improve disease surveillance and research and development of improved diagnostics, therapeutic agents and vaccines serve the dual purpose of protecting the public health and defending against biological weapons. For example, enhanced surveillance and response systems will allow faster detection and intervention for other infectious diseases that affect the U.S. population. Clinical, diagnostic, and epidemiological expertise are not currently available for detecting and combating certain key biological agents; moreover, improved computer hardware and software are needed to improve infectious disease surveillance and communication capabilities.

Very importantly, biomedical research must also be expanded to find new ways of preventing and treating infectious diseases. Basic research is the underpinning for the long term ability to address infectious disease threats.

None of the additional capacity implemented to counter the threat of bioterrorism will be inactive or wasted.

Thank you for the opportunity to testify. I would be pleased to respond to any questions.

STATEMENT OF EDGAR THOMPSON, M.D., M.P.H., CHAIR, GOVERNMENT RELATIONS, ASSOCIATION OF STATE AND TERRITORIAL HEALTH OFFICIALS

Senator FAIRCLOTH. Dr. Edward Thompson.

Dr. THOMPSON. Thank you, Senator.

Senator FAIRCLOTH. You are—what is your title?

Dr. THOMPSON. I am the State health officer for the Mississippi State Department of Health. I am what in most States is called the commissioner of health.

Senator FAIRCLOTH. OK, yes. Thank you.

Dr. THOMPSON. We spoke earlier of plague, Senator. There is a human plague of which most of us are ignorant, but those of us named Ed are very familiar with it. The disease causes everyone to assume that if your name is Ed, it is short for Edward. In my case it is not. It is Edgar. But thank you for the attempt.

I am here representing the Association of State and Territorial Health Officials, and for the record I am Dr. Ed Thompson.

I would like to talk to you for a minute about why we as public health officials from the State level are here. I mean, after all, we need a Federal response to bioterrorism. The Federal agencies and the Department of Defense will take care of all this and everything will be well. Well, to quote Three Dog Night, "that ain't the way that it works." This is going to have to be addressed at the State level as well.

I would like to talk just a minute about why, in addition to our other expertise, we and some of the other public health doctors are here today. It is because we have seen a glimpse of the enemy. We have seen directly the effects of an outbreak of disease or an incident of chemical contamination in a population. Just 3 weeks ago we had a fatal case of—

Senator FAIRCLOTH. Where was this 3 weeks ago?

Dr. THOMPSON. Just 3 weeks ago in Mississippi, in Jackson. We had a fatal case of meningococcal meningitis in a school, and when you deal with the frightened parents and the frantic educators and the frothing media, you see in microcosm what a biological attack could do. Trying to provide reassurance in a packed community center in a north Mississippi town where three cases of Rocky Mountain spotted fever have occurred, two of them fatal, you see what terror is.

As shocking and deadly as the bombings of the World Trade Center and the Oklahoma City Federal Building were, the lethal and disruptive potential of biological agents is even greater with an ability to create sustained fear and disruption unmatched by explosives and chemical poisons. Any public health official who has dealt with the effect of even a small outbreak of infectious disease in a community can tell you that infectious agents are an ideal terrorist weapon.

Readiness for the possibility of biological terrorism not only means making sure our national security systems are adequate, but that our public health system has the ability and the resources to respond. An effective public health response can mean significant reduction of damage and death.

Now, a critical role of State health departments in responding to biological terrorist attack will be detection. The appearance of an

unusual disease or increased cases of an ordinary disease will likely be first recognized through public health surveillance at the State and local level. We saw this in 1984 in Oregon when a terrorist attack using salmonella bacteria was detected and averted when local public health authorities through basic public health surveillance identified the threat.

Another of our most important goals will be to provide manpower. Much of the case finding, immunizing, medication delivery, and other hands-on control will be done by State and local health department nurses, environmentalists, and disease investigators. Our experience with the chemical contamination of thousands of Mississippi homes with methyl parathion illustrates this. Despite the deployment of dozens of Federal personnel from several agencies, the majority of the manpower, or much of it nurse power, came from the State and local health departments.

Senator, you asked earlier if the Nation is prepared to respond to bioterrorism. Well, if the States are prepared, the Nation is prepared, and if the States are not, the Nation is not.

Are the States prepared? Well, States are not prepared now, but State and local health departments are uniquely qualified to become prepared and to fill critical roles. We have skill and experience in rapidly mounting mass immunization campaigns, large scale administration of medications, emergency public communications, and disaster response. We do all these things, not just practice them. We are the experts in basic surveillance and disease reporting because we are the ones who do it for most diseases. We have the foundation on which to build a solid system to deal with outbreaks and epidemics, whether natural or manmade, but much remains to be done.

The most immediate need is for a comprehensive national strategy to address the threat of bioterrorism. On May 22, the President announced his intent to create one and ASTHO commends him for that leadership. In holding this hearing, Senator, you too are providing leadership on this issue. But the focus so far has been on planning by Federal agencies. Dealing with bioterrorism will depend on civilian Federal agencies, the military, and State and local public health and other officials. No one of the three can do the job alone.

Congress and the administration need to convene a national planning process involving State and local governments, as well as the affected Federal agencies, including especially the Centers for Disease Control. We need a national plan coordinated at the Federal, State, and local levels among public health agencies, emergency management, law enforcement, and the military. This planning process must involve State and local public health officials at every stage.

The other major need is for resources. Some of these resources involve new technology or making existing technology available to States, especially the public health laboratories. But even more important is support, funding, for essential public health activities and infrastructure. Not all the infrastructure needed by the States is at the State level. CDC and its infectious disease and environmental laboratories are national resources on which all States

draw in public health emergencies. Funding to improve and assure their capacity to meet these needs is critical to the States.

Only the coordinated national planning process we are calling for will answer the question of what defending against bioterrorism will cost. We estimate as much as \$200 million for public health infrastructure alone, but it will be a unique bargain. Some emergency preparedness measures are limited to emergency use. Public health preparedness for bioterrorism is a broader investment.

PREPARED STATEMENT

Improved surveillance, laboratory capability, and communication systems will be immediately applicable to naturally occurring diseases, including emerging infectious diseases and epidemic diseases, such as influenza. The same technology and infrastructure that is needed to detect and control disease of deliberate origin can be used against naturally occurring health threats day in and day out in every State.

I thank you and I look forward to answering the questions at the appropriate time.

Senator FAIRCLOTH. Thank you, Dr. Thompson.

[The statement follows:]

PREPARED STATEMENT OF DR. EDWARD THOMPSON

Mr. Chairman, Senator Faircloth, Senator Cochran and other Members of the Subcommittee, I am Dr. Ed Thompson, Health Commissioner for the State of Mississippi. I am here today representing the Association of State and Territorial Health Officials (ASTHO). ASTHO is an alliance of the chief health officer in each of the 57 states and territories in the United States. My testimony also reflects the perspectives of the Council of State and Territorial Epidemiologists and the Association of State and Territorial Public Health Laboratory Directors. It is not intended to represent a formal position on the part of any of the three organizations, as none of them have adopted specific positions on this issue.

ASTHO greatly appreciates the leadership that you have shown, Mr. Chairman, in holding this hearing on the role of public health in responding to bioterrorist threats, a subject of immense importance for our nation's security and well-being, and currently overlooked. ASTHO also greatly appreciates the leadership you have shown, Senator Faircloth, in sponsoring S. 1786, a bill requesting the Centers for Disease Control and Prevention to report within 60 days information regarding its ability to respond to the growing threats of viral epidemics and biologic and chemical terrorism and the resources it needs to adequately respond. This bill, and your interest in bringing this issue to the attention of the Congress, is federal leadership at its best. ASTHO applauds you and thanks you. I also want to extend special appreciation to Senator Cochran who has always been particularly responsive to state health officials' program priorities and to the public health needs of the citizens of Mississippi and the nation.

I don't need to remind this Subcommittee why this hearing is needed. The terrorist bombing of the World Trade Center in 1993 and the Alfred P. Murrah Federal Building in Oklahoma City in 1995, and the nerve gas attack on the Tokyo subway in 1995 are seared into Americans' consciousness. As shocking and deadly as these bomb and chemical attacks were, the lethal and disruptive potential of biological agents is even greater, with an ability to create sustained fear and disruption unmatched by explosives and chemical poisons.

Recent conflict with Iraq over weapons inspections remind us that biological and chemical weapons are probably in the possession of a number of hostile governments. Even more frightening, weapons of mass destruction, including deadly biological agents, are very likely within the capability of a number of non-governmental extremist groups both domestic and foreign.

This means we must also be aware of and prepared for the possibility of a major biological terrorist event here, at home, in the United States. Readiness for such an attack not only means making sure our national security systems are adequate and vigilant, but that our public health system at the federal, state and local level has the ability and the resources to rapidly identify, investigate and control the con-

sequences of a terrorist event that could affect thousands of Americans. An efficient, effective public health response can mean the difference between chaos, widespread panic and increased casualties and significant reduction of disease, disability and death related to the event.

The importance of the public health role cannot be overemphasized. For example, in the case of a biologic terrorist attack involving the release of smallpox at a major sports event in an outdoor stadium in a major U.S. city, such as Los Angeles, the disease, which has a 30 percent fatality rate among healthy adults, would rapidly become epidemic. The longer the release event goes unrecognized, the more widespread the infection and the number of eventual victims could quickly become millions.

My testimony will address the specific role of state health departments in responding to a serious biological terrorist event, the current readiness of states to respond, and what states need to appropriately respond. I will confine my comments to a biologic terrorist event because a chemical or radiological attack, for many states, falls largely to other agencies such as emergency management, for major response. An attack involving a biologic agent, on the other hand, uniquely requires the capabilities of the state health department.

My testimony will also point out that appropriately preparing for a bioterrorist attack will have positive outcomes—on a daily basis—by improving our ability to address naturally occurring infectious disease outbreaks, food safety concerns and environmental hazards.

THE STATE HEALTH DEPARTMENT'S ROLE IN RESPONDING TO BIOTERRORIST THREATS

The role of state health departments in responding to a biological terrorist attack will be first and foremost detection. The appearance of an unusual disease, or increased cases of an "ordinary" disease, will likely be first recognized through basic public health surveillance at the state and local level. Identification of the causative agent of any unusual disease cluster or outbreak may well fall first to state or local public health laboratories. We have seen this already in the 1984 salmonella poisoning in Oregon where a terrorist attack was detected and averted when local public health authorities, carrying out their basic public health surveillance, identified the threat.¹

Another primary role for state health departments in the event of a biological terrorist attack is coordinating assistance to local health departments that may become quickly overwhelmed and reporting epidemiologic findings to appropriate federal agencies, primarily the Centers for Disease Control and Prevention. Each state's health department is likely to be substantially engaged in any serious biological terrorist attack within its borders even if only a few individuals become seriously ill.

Another key state activity is the development of a bioterrorist plan that actively involves the participation of the state's health department. Regular training, including periodic table top and field practice drills, implementing the bioterrorist plan will be required. Regular updating of the plan will be needed as intelligence about likely bioterrorist agents becomes available. It is essential that state health departments have the resources to respond to a major bioterrorist event within their state borders because proximity reduces the time involved to detect the agent which in turn is essential to institute control and treatment measures that will reduce related disease and death. The reality is that minutes count when responding to a bioterrorist attack.

One of our most important roles will be to provide most of the actual response force. At the most basic level, whatever combination of case-finding, interviewing, immunizing, medication delivery, or other hands-on control techniques are needed for the particular biological agent and situation will be largely carried out by state and/or local health department staff. It is our nurses, our environmentalists, our disease investigators who will actually do the work, if it gets done. Mississippi's recent experience with the chemical contamination of thousands of homes with methyl parathion illustrates this. Despite the deployment of dozens of federal personnel from several agencies, the majority of the manpower (much of it nursepower) came from the state and local health departments.

The likely scenario that a few major cities have either already tested, or are planning to test, in a table top exercise unfolds as follows: A bioterrorist event occurs involving the unannounced release of anthrax spores in an open air location during a major public event. The first responsibility immediately falls to the local health department to detect that an unusual number and type of case reporting is occur-

¹Torok, Thomas, J., et al. A Large Community Outbreak of Salmonellosis Caused by Intentional Contamination of Restaurant Salad Bars. *JAMA*, Vol 278:5, pp. 389-395.

ring. Responsibility for diagnosis of the agent falls next to the local or state public health laboratory. Investigation, by interviewing victims, again is the responsibility of the local health department, with assistance from the state health department, in order to identify the source of the agent, when the release took place, and who might have been exposed. Other critical phases of the exercise where major responsibility falls to the local health department, with assistance from the state health department, involves the distribution of vaccine and other essential treatment resources and distribution of diseased victims around the state and region as thousands become symptomatic.

Essential state health department functions in preparing for and responding to a bioterrorist incident would involve the following specific activities:

- Epidemiologic surveillance.*—Active surveillance for the occurrence of unusual diseases or conditions. This is an essential current function that needs significant enhancement to ensure timely detection of a bioterrorist event. Timeliness is critical. Victims of a biologic attack will not exhibit symptoms for days, or even weeks. The delay between exposure and onset of illness, in the case of an infectious agent such as smallpox, can mean spread of the disease to hundreds, even thousands. If it occurs in a major metropolitan area the disease could become pandemic in a matter of hours. Detecting the agent as soon as possible can save lives.
- Active surveillance involves active monitoring of a comprehensive reporting system and both routine and periodic education of mandated reporters: physicians, hospitals, medical examiners, and clinical laboratories about the signs and symptoms indicative of exposure to the most likely bioterrorist agents. These include the infectious microorganisms that cause anthrax, brucellosis, plague, Q-fever, tularemia, smallpox, viral encephalitis, and hemorrhagic fever; and the bacteria-produced poisons botulinum toxin and staphylococcal enterotoxin B; the plant-derived toxin ricin, and fungal metabolite T-2 mycotoxin. These are the core military biological weapons. In addition, surveillance of the state's vital records department for premature deaths in otherwise healthy individuals will signal unusual disease exposure. To conduct active surveillance, state health departments will need adequate numbers of epidemiologists trained in recognizing and instituting appropriate control measures for both natural, unintentional events such as pandemic influenza as well as bioterrorist agents.
- Laboratory analysis.*—Active surveillance is dependent upon laboratory capability to rapidly analyze samples for exposure to bioterrorist agents. This requires, ideally, at least one laboratory per state that is appropriately equipped to detect the most hazardous etiologic agents such as smallpox, and *Bacillus Anthracis*, the causative agent of anthrax. This requires at a minimum Biosafety Level 3 containment facilities. Biosafety Level 4 containment facilities, may be needed in certain high risk states, or regionally, but the Centers for Disease Control could handle this function if provided additional capacity. If established in states or regions, Biosafety Level 4 facilities also require personnel trained in handling, testing and reporting biohazardous agents and the availability of laboratory assays indicating exposure to nerve agents and cyanide and serological, immunological, and nuclear assays for identification of all the expected biological terrorist agents.
- Public health laboratories are ideally suited for the critical role of identifying bioterrorist agents, but most will need considerable upgrading to carry out their essential detection function, and should have access to rapid detection kits for the most likely bioterrorist agents currently only available to the military. These "smart kits," or other instrumentation like them, that have been developed by the National Naval Research Institute should be required equipment in every state and local public health laboratory. State public health laboratories also need protocols and procedures for rapid submission of samples both from the field (hospitals, commercial laboratories and local health departments) and to CDC which serves as a national and world-wide reference laboratory. Additional laboratory staff trained in detecting bioterrorism agents will need to be located in close proximity to high risk metropolitan areas.
- Verification of the bioterrorist agent through laboratory analysis is essential to institute effective delivery of definitive treatment measures. Rapid, seamless electronic communications among federal, state, and local levels is also an important public health laboratory capability. Again, minutes count when responding to a bioterrorist attack.
- Epidemiologic investigation.*—Rapid, efficient epidemiological investigation will be needed to identify likely sources of contamination or infection, e.g., common food, water, or air sources. This involves basic "shoe leather" epidemiologic interviews with those who have been exposed as well as others logically con-

- nected to the event. This function is essential to establish where the exposure to the bioterrorist agent occurred and when it occurred so that appropriate control and treatment measures, such as rapidly distributing ameliorating vaccine, can be instituted. This involves having adequate numbers of infectious and environmental epidemiologists additionally trained in bioterrorist detection that can be made available to local health departments. It also means "shoe leather" interviewers should be considered for advance vaccination protection as essential health care workers.
- The importance of this basic public health activity cannot be overemphasized. It is essential to effective control of an infectious agent that can rapidly affect thousands and even threaten millions of lives world wide if it becomes pandemic.
 - Information and communications systems.*—Reporting will need to be electronic and permit receipt, compilation and analysis of information from multiple reporting sources such local health departments, hospitals, clinics, etc. This is also critical with regard to laboratories which must have communication links to federal, state, and local public health agencies. The communication system must be electronically compatible and, ideally provide 100 percent coverage of the state's population. Communications also need to be seamless with federal agencies, particularly CDC as it will have an important role as well in any bioterrorist event.
 - Coordination of essential equipment and treatment.*—State's will need to be able to coordinate essential equipment and treatment facilities needed at the local level. Some of the considerations will include:
 - Health care facilities and personnel.*—In the case of an infectious biologic terrorist agent such as smallpox, the impact will be felt first in emergency rooms, physician's offices, and medical clinics. To protect essential health care workers against biologic agents, a national program of voluntary vaccination against likely, known military agents such as anthrax and smallpox, should be considered. Essential health care workers include physicians, nurses, laboratory workers and other allied health care workers such as radiology technicians and as already discussed, essential state and local health department officials and workers. A biological terrorist incident probably will not be effectively controlled without instituting, in advance, protections for these essential individuals. On the other hand, current limited supplies of smallpox and anthrax vaccine probably should not be used for first responders since they are unlikely to come in contact with victims of biologic terrorism.
 - Isolation beds.*—In the case of an infectious disease agent, such as smallpox, an adequate number of isolation beds to treat several thousand victims must be developed, designated and coordinated. This must be an essential component of the state's bioterrorist plan. Implementation of rapid isolation measures, and other controls, will be imperative in halting the spread of the disease. Because of the likely number of victims involved, state health departments will need to coordinate distribution of victims around the state in medical treatment facilities and, in many cases, across state lines to nearby cities.
 - Availability and distribution of vaccines and other necessary treatment resources.*—The President has made this a national priority and state health officials applaud him for his leadership in addressing this critical need. A national stockpile of vaccines against the most likely biologic terrorist agents is absolutely essential in any effort to respond to a biologic terrorist event. Rapidly identifying and vaccinating individuals not yet sick, but who have been exposed to a terrorist agent, can prevent development of the disease, or ameliorate its consequences. Organizing the distribution of vaccine is a basic, public health role, and must be part of a state's bioterrorist plan.
 - Much must be done, and done immediately, before it is too late. The Institute of Medicine, at the request of the Department of Health and Human Resources, is currently developing a report on the research and development needs for biologic and chemical terrorist agents. The Congress and the Administration should move to implement its recommendations immediately and begin production of a civilian stockpile of vaccine against the most likely biologic terrorist agents as a national priority.
 - Other treatment needs can be stockpiled in designated major hospitals, Red Cross facilities, or other sites in high risk areas. These would include a range of antibiotics, blood supplies, various intravenous fluids for hydration, nutrition and other needs. These also must be addressed in the state's bioterrorist plan.

ARE STATES PREPARED TO RESPOND TO A BIOTERRORIST EVENT?

The “short answer” is no, but the answer is not short. States are not prepared now, but state and local health departments are uniquely qualified to become prepared and fill critical roles. We have skill and experience in rapidly mounting mass immunization campaigns, large-scale administration of medications, emergency public communications, and disaster response. We do all these things—not just practice them—on an all-too frequent basis. We are the “experts” in basic surveillance and disease reporting, because we are the ones who do it for most diseases. We have the foundation on which to build a solid system to deal with biological cataclysm, whether man-made or natural.

But in many ways we are not yet prepared. The potential is there, but much remains to be done.

Critically, resources, both human and technical, are not adequate. Some need to be developed, and some that once were adequate have eroded. A fundamental need is to “shore up” and improve our dangerously neglected basic public health capabilities.

A second major unmet need is planning. Most states do not have a bioterrorist plan. Some states are currently working on a bioterrorist addendum to their medical disaster plan—New York and Texas are two examples. Minnesota is ready to conduct a table top test of its bioterrorist plan. There are several others moving in this direction. But every state needs to make this a priority.

A case example of how ill-prepared state health departments feel they are to respond to a bioterrorist event is the quote below from a draft document on catastrophic disaster and terrorism by the Illinois Department of Health. The document reflects a statewide effort.

“The Department is mandated to protect the public health and safety of the citizens of Illinois. However, limited opportunities have been made available to adequately prepare staff for a response to a terrorist incident involving radiological, biological, or chemical materials. Therefore, the Department’s response capabilities are currently limited. Several factors have prevented the Department from attaining a higher level of preparedness. These factors include: absence of a consistent funding source for training and education programs; limited personnel in infectious diseases, environmental health and laboratory services programs; and a lack of Federal guidance and information on source standards and detection methods.”²

A key issue in successful planning is for state health departments to be active participants in emergency management plans for responding to bioterrorism. This is not happening to the extent it should in many states. State health departments must be regarded as essential partners in bioterrorist planning.

To assist state and local governments in the development of bioterrorist preparedness, ASTHO calls upon the Congress and the Administration to convene a national planning process that will involve all affected federal agencies, including especially the Department of Health and Human Services which has too often been overlooked in its important role in the case of a civilian bioterrorist event, and state and local governments. A primary goal of the planning process, in addition to delineating activities and coordination among federal agencies, should be to provide guidelines, or a model bioterrorist plan, to state and local governments that they can adapt to their particular needs and resources. States could significantly inform and assist the national planning process—now—by surveying their public health resources, including epidemiologic and laboratory resources; medical care resources; and other key resources such as appropriate stockpiling centers. California is currently undergoing a survey of its resources to develop its bioterrorism plan.

WHAT RESOURCES DO STATES NEED NOW TO BE PREPARED FOR A CIVILIAN BIOTERRORIST EVENT?

The first thing states need to be prepared is a plan. As already discussed, this should be a national priority and will involve coordination at the federal, state and local levels among public health agencies, but also with emergency management agencies, law enforcement agencies, the military, and potentially many more.

The other major need is for material resources. Some of these resources involve new technology, or making existing technology appropriately available to states, especially their public health laboratories. But even more important is support—funding—for old fashioned, but essential public health activities and infrastructure.

Congress has recently been engaged in a massive debate over the state of the nation’s public works infrastructure. The widely supported conclusion is that we must

² Illinois Department of Public Health. Catastrophic Disaster/Terrorism Report. Draft report.

upgrade our nation's highways which are becoming clogged with traffic, and rebuild dangerously crumbling bridges and tunnels. Congress has made the commitment to spend the nation's resources to upgrade and update this fundamental underpinning of our way of life: transportation.

State health officials are extremely concerned about another essential, threatened underpinning of the American way of life: public health. Public health infrastructure is not visible like highways and bridges, but it is no less important. It has been steadily eroding over the past two decades and is in desperate need of upgrading. The extant challenges of food safety, pandemic influenza, and unintentional environmental hazards are daunting enough without adequate, updated resources, but the prospect of a civilian bioterrorist event involving thousands of casualties is overwhelming.

The importance of the role of public health in a bioterrorist event cannot be over emphasized. The greatest need—now—at the state level is for planning and supporting and upgrading existing infrastructure as follows:

—*States need adequate epidemiologic resources—surveillance and investigation.*—

An important obstacle to developing bioterrorist preparedness is the categorical nature of current surveillance funding. At least 80 percent of a given state's federally supported surveillance must be committed to HIV/AIDS, TB, and STDs (Sexually Transmitted Diseases). Many states have no funds available to them for generic, active surveillance of the occurrence of unusual disease or conditions. This is a major public health infrastructure weakness that a bioterrorist event would exploit immediately with terrible consequences in unnecessary disease, disability and death. States need a source of unfettered funding for active, generic surveillance systems which also benefit preparedness for non-terrorist events such as influenza, unintentional food poisoning or environmental hazards. This should be a priority for Congress and the Administration, but must not come at the expense of funding for current programs which are vital and needed. States also need an adequate number of epidemiologists trained in detection, control and treatment of bioterrorist agents.

—*States need upgraded public health laboratory facilities and trained personnel.*—

State public health laboratories are not currently equipped to detect the most likely bioterrorist agents such as anthrax and smallpox. ASTHO recommends that most states have a Biosafety Level 3 facility. The national planning process should address the question of whether particularly high risk states, or regions should have a Biosafety Level 4 facility, or whether all highly hazardous agents should be forwarded to CDC for comprehensive analysis. If the latter, CDC will clearly need resources to develop additional capacity. Again, the primary issue is rapidity of diagnosis, but other concerns are the numbers of specimens that may be involved in a bioterrorist event and maintenance of skills in handling hazardous materials. It is clear, however, that all state public health laboratories require updated technologies to quickly identify unusual microbiol agents, determine their antibiotic susceptibility, and point of origin. "Smart kits" should be made available for quick screening of the most likely bioterrorist agents; newer technologies such as polymerase chain reaction (PCR) are needed, but many state public health laboratories lack the equipment, staff and training to provide these services. Once again, enhancement of state and CDC laboratory capacity should not come at the expense of existing program funding.

States need enhanced, electronic information and communications systems to permit rapid assessment, analysis, and reporting.

OTHER IMPORTANT BENEFITS THAT RESULT FROM BEING PREPARED FOR A CIVILIAN BIOTERRORIST EVENT

Enhancing public health infrastructure at the federal, state and local levels to prepare for a civilian bioterrorist event has many important benefits for the public's health. Improved surveillance, investigation, laboratory capability, and communications systems will be immediately applicable to food safety, unintentional environmental hazards, and influenza, both the pandemic (approximately every ten years) and inter pandemic time periods. State health department officials are faced, nearly every day, with the need to evaluate the risk or occurrence of disease outbreak or environmental health hazards. An adequate, updated public health infrastructure will yield a real return on every dollar invested in prevented disease and avoided health care costs.

Some emergency preparedness measures, though necessary, are largely limited to emergency use. The second largest fire department in Minneapolis is at the airport just outside the city. Every day the airport fire department stands ready to respond to major disaster. Equipment is in excellent maintenance condition, it's upgraded

regularly and personnel conduct regular practice runs to keep their skills honed. Minneapolis has never had an airline disaster, but its airport couldn't operate without its fire department.

Public health preparedness for civilian bioterrorism is an even better investment bet. Much of the enhancement in infrastructure would be used daily and have positive consequences—every day—for the public's health. The same technology and infrastructure that is needed to detect and control disease of deliberate origin in emergencies can be used against naturally occurring health threats day in and day out in every state. The high tech troop carrier we need to fight the war can be an efficient school bus if the war never comes.

SUMMARY OF ASTHO'S RECOMMENDATIONS

A national planning process involving federal, state, and local governments to respond to civilian bioterrorism should be convened. The planning process should emphasize the role of public health at all levels of government as the first line of defense after a bioterrorist attack has occurred and a critical component in all phases of the crisis.

In conjunction with the national planning process, each state should develop a bioterrorism plan and survey their current resources as a basis for strategic action.

There should be increased national resources committed to enhancing the nation's public health infrastructure at the federal, state and local level to address bioterrorism. Infrastructure enhancements should address identified laboratory needs within the CDC, surveillance and epidemiologic investigation at the state and local level, state and local public health laboratory capability, and enhanced information and communication systems. State and local public health infrastructure funding should be flexible to permit each entity to address its own specific infrastructure needs.

ASTHO estimates that \$200 million will be needed to fund state and local public health infrastructure needs to respond to bioterrorism, but cautions that precise funding requirements will only become evident through a national planning process.

STATEMENT OF RALPH D. MORRIS, M.D., M.P.H., PRESIDENT, NATIONAL ASSOCIATION OF COUNTY AND CITY HEALTH OFFICIALS

Senator FAIRCLOTH. Senator Cochran had planned to be here with you this afternoon, but because a number—and I understand a large number—of Senators are going to be out of town at Senator Goldwater's funeral tomorrow, he had to reschedule the hearing on Governmental Affairs which he chairs. So, he sends his apologies for not being able to be with you.

Dr. THOMPSON. We will forgive him.

Senator FAIRCLOTH. Our next witness, Dr. Ralph Morris, is president of the National Association of County and City Health Officials. This group represents nearly 3,000 local public health departments. He is a doctor and director of the Galveston County Health Department.

Dr. Morris, we are delighted to have you. Are you not glad you did not have that job in 1908 or 1903 or whenever the hurricane destroyed the city?

Dr. MORRIS. We are actually getting ready to commemorate the 100th year anniversary of that 1900 hurricane in another 2 years.

Senator FAIRCLOTH. What year did it happen?

Dr. MORRIS. 1900, and it was the largest natural disaster this country has ever experienced with approximately 6,000 deaths. I can assure you, sir, as the local health officer, that is one of the things that weighs very heavy on my mind in terms of planning for disasters and we take it very seriously in Galveston County in terms of hurricane preparedness.

Senator FAIRCLOTH. I do a lot of reading. I just read a book on raising the island 18 feet after the hurricane by building a seawall.

Dr. MORRIS. That is correct.

Senator FAIRCLOTH. Dr. Morris, we will hear your testimony.

Dr. MORRIS. OK. Thank you, sir.

Good afternoon, Mr. Chairman. My name is Ralph Morris. I am director of the Galveston County Health District and I am pleased to serve as president of the National Association of City and County Health Officials [NACCHO]. NACCHO is the organization representing almost 3,000 local health departments across this country.

Senator Faircloth, on behalf of the Nation's public health officials, I want to thank you for your invaluable leadership in addressing these important issues under discussion today.

I am here today to explain how local health departments serve on the front lines in battling public health crises of all sorts and why we need a national network of electronic communication among local, State, and Federal public health agencies.

When an outbreak occurs, regardless of the cause, local health departments and State health departments are responsible for gathering information and determining the cause. This process is called disease surveillance and it is a fundamental function of public health at the local, State, and Federal level. Surveillance is our early warning system for protecting the public.

In order to conduct disease surveillance effectively, local health departments must be able to exchange information with local doctors, hospitals, other local health departments, State health departments, and CDC. A local health department does the groundwork such as tracking down who has been exposed, gathering information about the exposure, obtaining laboratory specimens, and preventing further spread of the disease. The local health department is responsible for giving accurate and timely information to the media, to the community, hospitals, doctors, and local elected officials.

Let me give you some real-life examples.

In Galveston last February, a case of meningococcal septicemia was reported to our department on Monday morning. It happens that the weekend before was Mardi Gras and that the patient was an escort to one of the duchesses. Mardi Gras attracts approximately 100,000 to 200,000 people to the island. This individual attended two balls during Mardi Gras and was also on a float on the main parade of Mardi Gras. It was a very lonely feeling to get that report of this contagious, potentially fatal disease.

We had to find out and start treatment of individuals who were scattered all over the State who had been exposed to the disease. We used phones to work with other local health departments and the State health department. We played phone tag and relied on voice mail and spent an undue amount of time arriving at a common understanding of the problem and what we needed to do to solve it. If we had been electronically connected with the State health department and other local health departments, the process would have been much faster. Fortunately, we had no secondary cases and the patient did survive.

Last winter in Texas, we faced another outbreak of invasive group A *Streptococcus*, also known as flesh-eating bacteria. If we had had state-of-the-art communications, we would have been able to quickly exchange information about where the cases were found

and to accurately inform the community and local officials about this frightening organism.

Recently we have dealt with an influx of smoke and haze from Mexico which presented an immediate health threat to the general public, as well as susceptible individuals. Here again, an electronic network would have allowed us to do our work more thoroughly, timely, and in an accurate manner. In addition, many of us were not familiar with the specific health hazards of this smoke and haze from Mexico.

The knowledge gap is particularly alarming with respect to biological and chemical terrorism. Few of us in public health are familiar with the prevention, diagnosis, and treatment of the health effects of these agents of biological warfare. We need quick access to guidelines for implementing emergency measures, as well as an ability to communicate instantly and securely with other government agencies that would respond to terrorism. Diseases of biological terrorism are similar to other infectious diseases. They may be insidious in the onset and difficult to recognize. We will not recognize them promptly enough to save lives if we do not have good infrastructure for communication and access to information.

In the military and law enforcement, good communication are taken for granted. In public health, we are way behind. Most local health departments still rely on the phone, the fax machine, and paper and pencil to do their job, and many of the phones are still rotary. About one-half of all local health departments do not have the use of electronic mail. At least 1,000 local health departments have no access to any online or Internet service. Among those that do, one-third are not even linked to their State health department, and fewer than one-quarter can reach other local health departments electronically. Building an electronic network requires thoughtful planning, updated hardware and software, connections to the Internet, and training personnel how to use it.

NACCHO strongly supports the proposal under development at CDC for establishing a national health alert network. This network will equip the front lines of public health local health departments and, with essential electronic information tools, and train public health workers in the skills they need to protect the public.

Mr. Chairman, dramatic gains have been made in health in this country in the past century. Life expectancy has increased by 30 years; 25 of those years have been due to basic public health measures. Taking these gains for granted and letting the public health infrastructure deteriorate is asking for disaster. When public health in one location suffers, the health of the Nation as a whole is threatened because new health threats do not respect geographic or political boundaries.

PREPARED STATEMENT

CDC's health alert network will save critical time which will translate into saving lives. The health of all Americans depends on taking national proactive measures to preserve, coordinate, and strengthen our public health system.

Thank you very much.

Senator FAIRCLOTH. Thank you, Dr. Morris.

[The statement follows:]

PREPARED STATEMENT OF DR. RALPH D. MORRIS

Good morning, Mr. Chairman and members of the Subcommittee. I am Ralph D. Morris, MD, MPH. I am Director of the Galveston County Health Department in Texas and am pleased also to serve as President of the National Association of County and City Health Officials (NACCHO). NACCHO is the organization representing the almost 3,000 local public health departments in the country. I am here today to explain how local health departments serve on the front lines in battling public health crises of all sorts, and why we need a national network of electronic communications among public health agencies to help protect our communities from the public health consequences of acts of terrorism. The same high-speed access to information that is essential for this purpose is equally important in helping local health departments deal with a myriad of other alarming public health threats, such as new and virulent infectious diseases and diseases that are spread through our food supply.

Outbreaks of disease can occur for many reasons—because one child infected with infectious bacterial meningitis spends a day going to classes in a school before his illness is diagnosed—because one shipment of frozen strawberries from Mexico arrives in grocery stores infected with the Hepatitis A virus—because a hurricane or a flood disrupts water and sewer lines and causes a public water supply to become dangerously contaminated—or because a criminal introduces a lethal biological agent, such as anthrax, into the air. Whatever the reason for an unusual outbreak of illness, the local health department has the local responsibility for detecting that outbreak, tracing it to its source, and stopping its spread.

The potential public health threats we all face are growing in number and complexity. Rapid air travel means grave infectious diseases can be spread from one country to another simply when an infected person takes a plane flight. Our food supply has become globalized, and we are more vulnerable to food-borne diseases from imported food than ever before. Insidious bacteria that have mutated so that they are no longer easily treatable with existing antibiotics are multiplying in number. Virulent new viruses, such as hantavirus and Ebola, are emerging. And reports of instances where persons have access to biological weapons are increasing. While we rely on law enforcement to prevent and deal with criminal acts, when those acts pose a threat to health, we rely on the public health system. Just as our military needs to keep up a defense against new weapons development, so our public health system must maintain a defense against new diseases and new ways that diseases can be spread.

When people get sick, they seek care from their doctor or a hospital. No single physician or hospital will necessarily notice that anything unusual is occurring—but if they all report any one case of unusual infectious disease that they observe, the local health department can put that information together to discern a pattern. This process is called disease surveillance, and it is a fundamental function of public health at the local, state and federal levels. Surveillance is our early warning system that something is wrong.

In order to conduct disease surveillance effectively, local health departments must be able to send and receive information quickly to and from local doctors and hospitals, to and from health departments in neighboring jurisdictions, to and from the state health department, and to and from the Centers for Disease Control and Prevention in Atlanta. The local health department does the work on the ground, such as tracking down who has been exposed to a disease, sometimes obtaining laboratory specimens for accurate diagnosis, and taking whatever measures are necessary to prevent its further spread. The local health department also is responsible for giving accurate and timely information to the media and the community. In order to do its job, the health department needs not only local expertise, but also immediate access to higher levels of expertise that are available at the state health department and at CDC.

In Galveston last February, we discovered a case of meningococcal septicemia in a participant in the Mardi Gras parade. We had to find and notify persons who had subsequently scattered all over the state that they'd been exposed to this potentially fatal disease. We used phones to work with other local health departments. We played phone tag, relied on messages, and spent an undue amount of time arriving at a common understanding of the problem and what we had to do to solve it. If all the local health departments had been connected electronically, the process would have taken place much faster.

Just a few months ago in Texas, several of our local health departments and the state were faced with an outbreak of invasive group A streptococcus, also known as "flesh-eating bacteria." Here again, if we'd had state-of-the-art communications, we'd have been able more quickly to exchange information about where cases were found

and get accurate information about this frightening organism out to the community. Now we are dealing with an influx of smoky, hazy air from Mexico, which has presented some immediate health hazards to susceptible people, as well as some longer-term hazards that we need to monitor. We could do this, and all our public health emergency response work, in a more thorough, timely and accurate manner with instant, uniform access to authoritative information.

Every day, my colleagues in other jurisdictions face outbreaks of illness caused by salmonella, E. Coli bacteria, the hepatitis A virus, meningococcal bacteria, and a frightening array of new antibiotic-resistant bacteria. None of these diseases respects city or county or state boundaries—we all must be well-prepared to share information about suspicious incidents of disease, deal with outbreaks and communicate about them to our neighbors. Agents of biological terrorism are highly similar to other agents of disease in that they may be insidious in onset and difficult to recognize. We won't recognize them promptly enough to save lives if we can't trade information with each other instantaneously.

Currently, electronic communications are the best way to send and receive data quickly, and the Internet is the best way to share data and get access to current information about a disease. In the military and in law enforcement, these methods of emergency communication are taken for granted. But in public health, we are way behind. Most health departments still rely on the phone, the fax machine, and paper and pencil to track down the information they need to evaluate reports of disease, identify who may have been exposed, analyze this data to determine whether they've got a potential epidemic on their hands, and call in expert advice. If they need to send or receive information quickly, they just cross their fingers that they can reach the right people by phone or that the fax goes through. If there is an epidemic in the making and preventive measures such as immunization of the population that has been exposed to a disease are possible, saving time means saving lives.

We have data that show just how far behind public health is in its access to the information superhighway. About one-half of all local health departments don't have the use of electronic mail. At least one thousand local health departments have no access to any on-line or Internet service. Among those that do, one-third are not even linked to their state health department, and fewer than one-quarter can reach other health departments electronically. In some health departments, up to five employees must share one computer.

Even where some type of electronic communications capacity exists, a huge problem remains. The capacity is useless unless people are trained to work with it effectively. Among those health departments that do have it, 70 percent of the health directors assessed that their staff had little or no expertise in using on-line data and services. Building an electronic communications network requires, therefore, not only acquiring appropriate, updated hardware and software and modem or cable connections to the Internet, but also training essential personnel how to use it.

The knowledge gap is particularly alarming with respect to biological and chemical terrorism. Few of us in public health are familiar with the prevention, diagnosis or treatment of the health effects from agents of biological warfare. We need quick access to authoritative guidelines for implementing emergency measures, as well as an ability to communicate instantaneously and securely with other government agencies that would respond to an instance of terrorism.

NACCHO strongly supports a proposal under development at CDC for establishing a national Health Alert Network that will fill the huge gap in communications capacity that now handicaps us in our ability to recognize and deal quickly with public health emergencies. Such a network must equip the front lines in public health, local health departments, with essential electronic information tools and train public health workers in the skills they need to use it well. There must be a seamless defensive shield, that enables the local, state and federal partners in public health to work together to meet every preventable health threat as it occurs. The same network that will equip us to cope with an act of terrorism, such as an intentional release of anthrax, will also equip us to deal with the threats that occur even more frequently, when contagious diseases or contaminated food or water threaten our communities.

I and my colleagues who work in local public health are accustomed to using scarce resources efficiently and creatively, but most of us just don't have enough to update our information systems and our staff to the level needed to meet the threats posed by our nation's growing vulnerability to new global health threats. I urge the Subcommittee to provide in fiscal year 1999 and subsequent years sufficient funding to develop a public health alert network in a planned, phased-in fashion. We just can't afford to get any farther behind. Whether the cause of a public health emer-

gency is an innocent cook at a church supper or an international terrorist, our need to respond quickly remains the same. Saving time means saving lives.

LACK OF PREPAREDNESS

Senator FAIRCLOTH. I think the general public is not aware of the overall lack of preparedness that exists in the country, and I think the Congress is not aware either.

Dr. Osterholm, you mentioned the Institute of Medicine report in your testimony. I wanted to restate their first recommendation which was to provide Federal funding to improve the State and local infrastructure. In your view why do we seem to keep having such a difficult time getting people to discuss or to focus on this need?

Dr. OSTERHOLM. Senator, I think the easy answer is, first of all, disease surveillance and infrastructure is not sexy. It is day-to-day work. It is like keeping our bridges in place. Very few times do you take your car and stop before you get to a bridge and decide do I go over it or not because I am not sure it is safe. You just assume it is safe. You take it for granted. We take for granted in this country that there is a system in place to detect infectious diseases to respond to infectious diseases and to plan for the future.

What we have really is a piecemeal surveillance system. We do not have a blueprint in this country for figuring out when and where and how we are going to detect infectious diseases. It would be like if every little phone company around the country could still set their own standards of how they are going to share information, it would be a disaster.

The way that that is most frequently manifested is how we come to Congress to get our money. As a State epidemiologist in a State health department and also a member of ASM, the way I do my disease surveillance is what can I get from immunization, what can I get from the STD program, what can I get from the HIV program, what can I get from emerging infectious diseases, what can I get from the Lyme disease program, and it is one big pot, and Peter robs Paul all the time to make sure that we have a basic infrastructure.

While I commend the CDC for the efforts demonstrated over here to the left of me with the emerging infectious diseases, at the same time we have seen major cuts in our funding support for immunization, HIV surveillance, for the area of STD and tuberculosis, so that we never have really established what does it take to do infectious disease surveillance in this country and what is it we need as a basic infrastructure.

So, the bottom line is I think the reason we do not have a good system is we have never really had a system. No. 1, and No. 2 is that as long as we continue to fund it by robbing Peter to pay Paul, you are always going to have a response like this and that is the whole basis upon which this Nation's protection is now sitting for the issue of bioterrorism.

Senator FAIRCLOTH. You mentioned the Institute of Medicine recommendation that physician groups be enlisted to protect the public and that is certainly reasonable. But we keep hearing that doctors are often part of the problem, not the solution, in addressing

and reporting symptoms that might indicate serious problems, that they simply do not do it. Is that true or not true?

Dr. OSTERHOLM. Well, Senator, I was born and raised in an area of Iowa that is well known for having a lot of sinkholes, these big holes in the ground that basically just keep getting bigger and bigger year after year. A long time ago, farmers recognized that if they keep pouring stuff down those holes, but they kept getting bigger anyway, after a while they stopped pouring things down the holes, meaning that after a while you learn that if what you do does not make any difference, then why continue to do it.

What has happened in many areas of this country is that physicians and other areas of the medical care delivery system do not work with their public health departments anymore because the public health departments have nobody to respond, so even if they did provide all the cases or they provided the information, it is kind of like the big sinkhole.

Public health clearly does not want that to be the case. We believe that that is not the way to run things. So, we have to have that system in place.

In our State of Minnesota, we have really put a real emphasis on this area and we have tried to be creative in our support of funding. In fact, about 95 percent of my budget there is what we call soft money, just like any other academic center. We are going out constantly trying to bring in money to support our infrastructure. In that case where we have been able to show a clinician that if you provide a service to us, meaning giving us the information, you will get something back and you will have a response system. That does not occur around much of the country.

So, I think that part of the problem clearly with physicians and the medical care system is in part education to make sure that they understand why and what they need to do, but part of it is, if you tell them to do something and there is no response, after a while they just will not do it anymore. I think that we have unfortunately far too often conditioned our medical community that public health will not be there in a way that will be sufficient to merit their effort.

Senator FAIRCLOTH. I want to come back to the question again in a minute.

But, Dr. Thompson, the National Governors Association has scheduled their first meeting on the subject of bioterrorism here in Washington on June 18. Do you know what we might expect to come out of that? You are going to be here I assume.

Dr. THOMPSON. I do not know that I will but I would certainly hope that the State health officials will be an integral part of that as we would be of anything addressing this issue.

I think what we will get out of it, I hope, is a recognition among the Governors that there are several classes of terrorism. Two or three of them are very similar in their effects and their response. The sort of terrorism that is done with explosives, the sort of terrorism done with chemicals is responded to fairly traditionally by emergency medical service first responders through our State disaster plans and similar plans that address a natural disaster or a manmade disaster where you have an impact and an aftermath of that impact.

Bioterrorism, attacks with biological agents, are a very different terrorist weapon, and I think as the Governors Association comes to recognize that, they will help us make the Congress and the administration recognize as well that bioterrorist attacks, of all the terrorist weapons that possibly could be used, are unique in several ways, the most important one of which is not just its effect. I believe that biological agents are potentially the most effective, the most devastating, and the most terrorizing of all the potential weapons, short of nuclear weapons, that terrorists could use.

But not even that, the most important distinction that I hope the Governors will come to understand and the rest of the Nation as well is that the response to biological attack, to biological agents will be different than it is to any other terrorist weapon because it will necessarily integrally and as the first focus involve State and local public health. It is where it will be detected because you will not see an explosion. You will see not even people flooding a hospital. You will see people coming into their doctor's office sick. After a while they may flood the hospital, but initially it is our surveillance systems that will pick up the first fluttering and catch it early or we will fail and we will wait until they flood the hospitals and it is too late. It is a different response pattern than you will use for any other terrorist attack.

And the third major distinction is although we have got to be prepared for all sorts of terrorism, bioterrorism preparedness has the almost unique quality of spilling over into everyday public health improvement activities because almost everything we need to do—almost, not quite, but almost everything we need to do—to prepare for a bioterrorist attack anywhere in the country will have daily applications. Those same laboratories, those same surveillance experts, those same epidemiologists, those same tools will be used every day with ordinary epidemics, with ordinary small outbreaks. Like a battle tank we have got to have to win the war that somehow has the ability to be a very efficient schoolbus, it is the best bargain of all the types of preparedness we have got to deal with.

That is what I hope we will accomplish in this meeting.

Senator FAIRCLOTH. As you described a bioterrorism attack—I must say I had imagined it entirely different from what you just said. I would have thought it would have been some sweeping panic that would strike us. You are saying it would be more of a creeping, devastating type of effect on our bodies that would take days and maybe weeks to begin to show?

Dr. THOMPSON. Yes; I almost hesitate to say what I am about to say, but I will. If we are very fortunate and we are some day attacked by very naive, very inastute terrorists, if we are lucky enough to get dumb terrorists, they will detonate a capsule of anthrax over a major sports stadium or they will announce that they have just set off a bomb containing botulinum toxin in a busy airport, that is if we are lucky.

If I were going to do it and if we get a smart terrorist, this is what they will do. They will quietly simultaneously or in quick succession release smallpox virus or some other communicable virus or bacteria in dozens of different locations, probably not——

Senator FAIRCLOTH. That virus you mentioned, how would that affect you?

Dr. THOMPSON. Smallpox? Smallpox would not begin to show—

Senator FAIRCLOTH. Oh, smallpox.

Dr. THOMPSON. Yes; old-fashioned smallpox which is not that difficult to obtain. Although it has been eradicated from human populations, lab samples are around.

Senator FAIRCLOTH. Would the immunity that we all got as children not—

Dr. THOMPSON. It is gone. So, we would begin to see after smallpox virus had been quietly and in an undetected manner released in dozens of locations, probably places like Jackson, MS, and Omaha, NE, probably not Los Angeles and New York—we would begin after several days to see symptoms, ill-defined symptoms, presented. As we began to recognize more and more cases of a disease we could not quite pin down, we would eventually diagnose smallpox through public health surveillance techniques, and by that time, second generation cases would be appearing in New York and San Francisco and places like that as the people who had been in Omaha, Jackson, and Tallahassee had now traveled to these large cities. It would have spread into our population in a very insidious fashion before we ever recognized that it occurred.

When a bomb blows up, you know where it hit. You know who it blew up and you know what has to be done for them. Bioterrorism with infectious agents has the ability to kill people, to make people sick, and to terrorize those who are not sick wondering if they may become sick. That is why it is such a terrifying weapon.

Senator FAIRCLOTH. That is frightening, and this is something that is frightening to not only me, but to a lot of the Congress also, more so than a bomb planted somewhere. As horrible as that is and as deadly as it is, it is likely to be confined to a building or is a contained type of terrorism, whereas the type of thing you are talking about, as rapidly as we move as a nation, the terrorist would not even have to do the spreading. They plant it in the proper airport, so they could pretty well cover the country by sundown if they got it out by breakfast.

Dr. THOMPSON. And we would not know they had been there until 2 days later or 3.

Senator FAIRCLOTH. Literally if you planted some sort of a virus at four, five, six major airports around the country in the morning, you would have it pretty well over the country by the end of that day.

Dr. THOMPSON. With some agents, that is true.

Senator FAIRCLOTH. If it moves that way. Certainly people would be all over the country by the end of the day.

It is frightening to think about. In talking to Dr. Knouss, I was somewhat frightened by his—I mean in testifying honestly—the lack of preparedness we might have was—Dr. Osterholm, do you want to comment on that or, Dr. Morris, or any of you? Were you—or did I misunderstand the testimony? Certainly it appears we need to do a lot in light of our current unpreparedness.

Dr. MORRIS. I think a lot of these new threats are just coming into our awareness and the public awareness.

Senator FAIRCLOTH. How recently, Dr. Morris?

Dr. MORRIS. I am sorry?

Senator FAIRCLOTH. How recently?

Dr. MORRIS. I would say in the past 2 or 3 years, particularly with the incidents that have been described earlier. I know for a local health department in terms of day-to-day activities, we have our hands full in terms of just keeping up with the regular activities that we have, and to talk about planning for something so catastrophic, as Dr. Thompson was just talking about, is almost unimaginable.

But I think we are at the point now where we have gotten a couple of wake-up calls that if we do not pay attention and start putting some resources or rededicating some resources, at some point in the future, we really could be in trouble in trying to respond to either a natural occurring epidemic or something that is manmade.

Dr. OSTERHOLM. Senator, I think that to answer that question as you posed it, having spent almost 25 years in public health, having been in the middle of a number of outbreaks of Legionnaire's disease, toxic shock syndrome, HIV, meningitis—I can go down the list—a number of food-borne outbreaks, there have been outbreaks that have clearly challenged us. There have been outbreaks when I had to be at the bedside and watch a 17-year-old boy die of meningococemia realizing he shared a birthday with my daughter. There were times that it was very hard to be in my job.

But there is simply nothing that scares the hell out of me like this issue because the implications for this are so far-reaching. It is so easy today to imagine how a terrorist could take a plane and fly a line from Arlington, VA, up to Silver Spring, MD, and put 2 million people in Washington, DC, at high risk of anthrax over the next 2, 3, or 4 weeks. It is very simple. Secretary Cohen showed that when he was on TV not long ago with his bag of flour that he demonstrated what it would be like if those were anthrax spores. Today if you hit a major building in this country with an aerosolizing device to put smallpox in would mean that in 2 weeks we could have tens to thousands of cases that then would spread out.

So, I think the implications are very, very high stake here. You heard earlier from Dr. Knouss the concept of very low probability but very, very high consequence.

I would just share with you I think as a local person out there representing a national organization that Washington has responded to the issues of terrorism. The problem is it continues to be oriented toward the area of chemical terrorism.

Senator FAIRCLOTH. The area of chemical?

Dr. OSTERHOLM. Chemical terrorism, the kind of situation that Dr. Thompson just shared with you. Nunn-Lugar legislation has helped us a great deal at the local level to begin dealing with chemical terrorism. It has done nothing for biologic terrorism. Giving the National Guard \$300 million and stationing 12 units around the country does little to nothing to help us with the planning of biological terrorism.

Frankly, it is the issue of the State and local health departments that have not been brought in on any of this in terms of planning and infrastructure support which is the critical first step. So, I think what we have to be careful here is not to confuse action as

opposed to what is going to make a difference, and there has been action but I have not seen a lot yet that is going to make a difference.

Senator FAIRCLOTH. Dr. Osterholm, one time I was deeply in debt to a bank when I was about 22 years old and far more than a 22-year-old should have been. I went in one day and he told me I had a problem. He told me that on a regular basis. And I asked him which one was he discussing. And he said, your problem is you are mistaking motion for action. And that is something we do often in government and in governmental policy.

One question I want to ask—and our time is running out. I understand there is a serious problem developing with microbes that are developing a resistance to the antibiotics that we have traditionally used. Of course, I grew up thinking that penicillin was the miracle cure for all of our problems. Why are these resistant microbes developing?

I mean, I understand they are developing resistance because of the overuse of antibiotics. So, that is the why. What do we do about it? Where is it developing? Where do we start? Is it animals, people, or is it a problem at all?

Dr. OSTERHOLM. Well, Senator, to give you the necessary short answer, I will abbreviate it, but we would all be happy, I think, to come back to a second hearing that could take up an entire day on this very issue, a very important issue, by the way, a very important issue.

I think the short answer is that whether it is in animals or in humans, whether it is domestic or international, we unfortunately have abused and used antibiotics in ways that were never intended. Frankly, Darwinian evolution is taking over. The bugs are winning, and while we have made great inroads in understanding that we have a problem today, we have only had limited action in terms of doing something about it.

Actually what we have here before you today in the issue of bioterrorism is very consistent with responding to antimicrobial resistance. One of the ways that we are going to do something about it is if we know about it, and today in many of our systems around the country, we do not have the ability to detect it until some clinician realizes that the antibiotics they were going to use for that patient are not working and only find out that that particular infectious agent is resistant to those bugs. We need a population based surveillance system that is routinely picking this up. If you have that in place and it is just, oh, by the way, so happens, unfortunately, a biological terrorism event occurs, you will pick that up too.

So, I think to address your question here, is if we had a better system in place, we could have the information to bring back the policymakers to other scientists to be able to say this is how bad the problem is right now. This is what is happening. What is it that we should and can do about it?

Senator FAIRCLOTH. How could you put such a system in place, Dr. Thompson or Dr. Morris, in Galveston or Jackson?

Dr. THOMPSON. I think the first key here is—and I tend to use the term “State and local health departments interchangeably be-

cause in Mississippi they are one and the same. In places like Texas——

Dr. MORRIS. They are not.

Dr. THOMPSON [continuing]. There are large city health departments that are independent of the State. The picture is quite different. So, you are talking about a State health department lab in Mississippi is comparable to a city health department lab, say, in Galveston or San Antonio.

But around the country there are State and large city health department laboratories that could form a big part of the basis for such a surveillance system. A lot of the technology is very complex, but some of it is not and can be accomplished on a regular basis by laboratories that are already there and need only a little bit of additional funding to become capable of watching for the development of antibiotic resistance. Some of the surveillance would require special laboratories and even that of the CDC, but the basic sort of watching to see when we see it coming could be done with a network of State and large local health department laboratories that already exist.

Dr. MORRIS. It has been mentioned earlier that the public health surveillance system in this country is really a haphazard system. I think the first step would be to establish some type of plan or coordinated effort between the Federal, State, and local levels of government in terms of surveillance.

Another essential component would be the training of public health workers at the three levels of government to be sure that they understand the plan and understand the basic concepts of surveillance and epidemiology, and then finally, giving those people and departments the necessary tools in terms of hardware and software so that they can carry out that type of surveillance.

I can tell you for a fact that is what we need in Texas in terms of developing some type of comprehensive, coordinated surveillance in our State.

Senator FAIRCLOTH. I understand this is coming about from the resistance to antibiotics because we are giving too many antibiotics. Is that a fair assumption of one of the problems? The resistance comes from overuse of the antibiotics?

Dr. MORRIS. Overuse and then incomplete treatment regimens. Certainly in dealing with tuberculosis, one of the major reasons has been people taking incomplete courses of antibiotics. Of course, that is a very long regimen.

Senator FAIRCLOTH. I remember some time ago, 40 years ago, penicillin had just become the all-time favorite drug and literally a lot of doctors were giving it for everything and in massive doses, I mean, bad colds, runny noses. You went to the doctor, you were almost sure to come out with a shot of penicillin regardless of what you went in with. I would assume that has changed, but that at one time was the thing.

I want to thank you all for being here today. I realize the inconvenience of coming from Minnesota, Mississippi, and Texas. But I want you to know that you play such a vital role in the preparedness that should exist nationwide.

The money problems we are simply going to have to address, but of all the things that we spend money on in this country—and we

spend massive amounts of it—I do not know of anything more important to the population of this country as a whole than those things we have been talking about here today. If we cannot put it in those channels, where are we going to put it? The public health service saves the lives and protects the public health and the overall welfare of the people.

So, we are all going to have to become advocates and we are going to have to speak up for these needs. In the Congress we can get penny wise and pound foolish and spend a lot of money in things that are not as potentially devastating to us as a Nation like the things we have been talking about today, and not only devastating as a Nation but for communities or individuals.

PREPARED STATEMENT OF SENATOR THAD COCHRAN

We have received a prepared statement from Senator Cochran, it will be inserted into the record at this point.

[The statement follows:]

PREPARED STATEMENT OF SENATOR THAD COCHRAN

Mr. Chairman, I believe as you do that there must be a stronger federal commitment to preparing our nation for the consequences of infectious disease outbreaks and lethal chemical exposure, terrorist or otherwise. In terrorist situations, our armed services and police forces will be required to act quickly to command and coordinate the investigation of the incident and culprits, ensure the prevention of possible civil unrest, and provide for the defense of United States citizens from ongoing attacks. However, the biological and chemical risks posed to our country present a much broader problem, one that must be addressed by the public health community—the Centers for Disease Control and Prevention (CDC) and State and Local Health Departments.

Whether the infectious disease event or chemical exposure results by way of nature, accident, or intent, the United States must have a public health mechanism adequately prepared to respond quickly and effectively to save lives. One of our witnesses, Mississippi State Department of Health Officer, Dr. F.E. "Ed" Thompson, Jr., last year successfully coordinated the efforts of both local and national public health organizations to quickly respond to widespread residential chemical exposure on the Mississippi Gulf Coast. Local bug sprayers had used cotton pesticides indoors and subjected residents to dangerous, if not deadly, levels of chemicals. Utilizing CDC environmental laboratories, Dr. Thompson was able to determine very quickly the levels of contaminants in individuals, so as to decide who would need to abandon their homes and seek alternative housing, while allowing those with safe levels to stay in their homes, thereby saving lives as well as government resources.

Mr. Chairman, I am hopeful that through today's hearing we can learn of additional ways we can prepare for the biological and chemical threats to our nation and can assist our local, State and national health organizations in meeting any challenges that may befall us.

ADDITIONAL COMMITTEE QUESTIONS

Senator FAIRCLOTH. There will be some additional questions which will be submitted for your response in the record.

[The following questions were not asked at the hearing, but were submitted to Dr. Thompson for response subsequent to the hearing.]

QUESTIONS SUBMITTED BY SENATOR THAD COCHRAN FOR RESPONSE OF DR. THOMPSON

Question. Dr. Thompson, many in Washington have suggested that the biological and chemical threat to the civilian population is best handled by the military, since it has great expertise in chemical and biological warfare defense and possesses facilities such as Fort Dietrich. The military will not doubt be a vital part of any re-

sponse to biological or chemical terrorism event, but do you think the military alone can adequately address the public health issues associated with such a catastrophe?

Answer. Clearly the military cannot handle a civilian bioterrorist event alone. While the military has capabilities, expertise, and resources that will be vital in responding to such events, effective response to bioterrorist attack cannot be mounted by the military alone, especially if the weapon is an infectious agent, such as smallpox. The public health skills, in-place systems, local knowledge, and public trust that state and local public health departments have will also be vital to adequate response. The third indispensable component will be Federal civilian public health agencies, primarily the CDC. All three, military, civilian Federal, and State/Local public health departments, will be essential; no one or two of them can handle it alone.

Question. Dr. Thompson, you described the need to fund a public health infrastructure. What is your estimate of the cost of such an infrastructure, on both the local, State, and National level?

Answer. An initial estimate of the cost of shoring up the public health infrastructure would be \$200 million for state and local needs, and at least \$108 million for CDC and its laboratories. A more accurate determination of additional needs would come as a part of the national planning process, with state and local involvement, recommended by ASTHO.

CONCLUSION OF HEARING

Senator FAIRCLOTH. So, I thank you for your awareness and alerting us to the problem, and I intend to follow it and to pursue it. I thank you for coming, that concludes our hearing. The subcommittee will stand in recess subject to the call of the Chair.

[Whereupon, at 4:07 p.m., Tuesday, June 2, the hearing was concluded, and the subcommittee was recessed, to reconvene subject to the call of the Chair.]